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THEORY OF THE CO-OPERATIVE BODY
IN EAST ASIA
—
ECONOMIC RECOVERY IN SHANGHAI
—
JAPANESE INVESTMENTS IN MANCHURIA

Vol. XXXV

APRIL, 1939

No. 4

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VOL. XXXV

SHANGHAI, APRIL, 1939

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FAR EASTERN CROSS-CURRENTS

A NOTED American foreign correspondent, the late Frank H. Simonds, called it the "trap door." Where this trap door leads, and what it may mean to the American people are recalled with appropriate timeliness by *The Saturday Evening Post* in an editorial in its issue of December 3 last which says:

"It now is nearly three years since Frank H. Simonds died, on January 23, 1936. All that he foresaw happening in Europe and much which he did not foresee have come about. Yet little of that which he did not foresee would have surprised him.

"A month or so before Mr. Simonds' death, H. J. Haskell, editor of the *Kansas City Star*, talked in Prague with former President Benes, then foreign minister of Czechoslovakia. The talk turned to Simonds and his pessimistic view of Europe, expressed in the *Post*.

"I am very fond of Frank," Benes told the Missouri editor, 'but you must remember that he is a skeptic.' Only, Mr. Haskell recalls, Benes pronounced it 'septic,' misled by the fickleness of the English c.

"It was Europe which was 'septic,' and it would have been well had Mr. Benes shared Simonds' cynicism.

"Frank Simonds' last writings appeared in the *Post* in October, November and December of 1935. American sentimentalists might have saved themselves great chagrin had they heeded what he told them once again. When John Bull's Holy War, the last of these articles, appeared, the crisis was between Great Britain and Italy. We repeat his final words to the American people:

"Those who would involve us in Europe, long ago abandoned all hope of getting us into the League of Nations by the front door. They have more recently put aside the dream of getting us there by the back door of the World Court. There remains the chance of getting us there by the trap door, which is the Executive branch of our Government. If only there is left to the President discretionary power to interpret neutrality laws in such fashion as to permit him to throw our influence on one side or the other of a European dispute, even before conflict actually begins, then the battle may yet be won. Against his head, in time of crisis, will be directed again, as in the present affair, all the combined resources of propaganda, foreign and domestic. And if he yields, the victories of the past, won against those who have striven to get us into the caldron of European strife, will be lost and the United States will be caught again."

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Apparently dissatisfied with the statement issued by the American State Department that "so far as it knows," Japan has not violated the 1922 Japanese-American treaty forbidding military or naval fortifications on the island of Yap and other mandated islands in the Pacific, the Senate naval affairs committee asked the State Department to furnish a more detailed report.

An official of the State Department, meanwhile, disclosed that Japan this year did not provide the United States with a copy of the report on the mandated islands which it annually submits to the Permanent Mandates Commission of the League of Nations.

Officials believe, however, that Japan has discontinued making such reports since it severed connections with the League. Even so, it is the opinion that Japan's abrogation of League ties does not absolve it of its obligation to furnish the United States with information.

There are no indications yet as to whether the State Department is contemplating action to ask Japan to provide a report.

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Any future Sino-Japanese peace negotiations may very likely see Wang Ching-wei, former Kuomintang Vice-President, in the rôle of indirect negotiator, a National Government official arriving recently from Chungking is quoted as saying in *Nan Hua Jih Pao*, Hongkong, February 10, 1939.

Editorially the same paper emphasizes that Mr. Wang's views are not as diametrically opposed to those held by the Chungking Government as is generally supposed.

The paper points out that Mr. Wang holds the terms proposed by Japan to form a basis for peace negotiations. An official declaration in Chungking declared that the present terms are too severe. However, the door is not slammed to any future negotiations when "reasonable" terms are offered, the paper stresses. This leads the *Nan Hua Jih Pao* to believe the National Government is not opposed to peace talks *per se*.

The Chinese Government, the paper goes on, still prefers the convocation of a general Pacific Conference, similar in scope to the Nine Power Conference, to direct talks between China and Japan. On the other hand the paper believes such a conference might only lead to making another Czechoslovakia out of China.

The *Osaka Mainichi*, February 19, adds:—"Sino-Japanese relations will have to be readjusted sooner or later. They probably will be, too, in which event Wang Ching-wei will have a very strong claim on the gratitude of his countrymen."

It is also reported that Premier Hiranuma said on March 6:—

"Japan will not antagonize the Chiang Kai-shek regime in case it thoroughly reconsiders its anti-Japanese attitude and co-operates with Japan in the construction of a new order in East Asia, but Japan cannot deal with a Chiang Kai-shek regime which has degenerated into a mere provincial administration as the Central Government of China."

Finally, on March 11, War Minister Itagaki pointed out that anti-Japanese sentiments were still dying hard in China, but he hoped the new Central Government of China would be formed before long in view of the movement in that direction sweeping China following the peace and national salvation campaign which was launched by Marshal Wu Pei-fu and Wang Ching-wei.

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The Japanese Foreign Minister Hachiro Arita said "No" when asked if Japan intended to take charge of the diplomatic affairs of the Wei Hsin and the provisional governments of the Chinese Republic, in Nanking and Peking respectively, in the course of the proceeding of the House budget subcommittee. The question was raised by Fukuzo Nakayama, Minseito, on the ground that neither of these governments are yet recognized by Western powers.

Mr. Arita's reply, in substance, was as follows:

That Japan is a stabilizing power in Far Eastern peace, is an unquestionable fact. Therefore, it is natural that Japan should be in a position to have a say in various matters in regard to peace and order in the Far East.

However, to be the sole diplomatic representative for the Wei Hsin and the provisional governments of China is contradictory to the primary spirit of Far Eastern reconstruction.

The new order in East Asia should be established with Japan, Manchoukuo, and New China each maintaining their respective independence, the three individual countries being united in a mutually co-operating group.

As far as diplomacy is concerned, that of New China should be handled by New China, Japan minding her own affairs.



Tolerance is not a sign of weakness, and intolerance is not a synonym for strength, the British Ambassador, Sir Robert Craigie, said on the occasion of the annual awarding of the Skakespeare medals at Tokyo Imperial University.

Sir Robert was very much concerned with the question of tolerance, which ran through the whole of his speech. The lesson that history teaches, he said, is that intolerance sows the seeds of destruction and discord and that it is those who have strength that can afford to be tolerant.

The great output of literature in Elizabethan England was due, he claimed, to the increase in tolerance which marked the reign. And this "goes to prove my point that tolerance and strength go hand in hand."

"In studying other countries, we are increasing our tolerance, getting the other fellow's point of view, and in so doing we are not decreasing, but increasing our store of national strength."

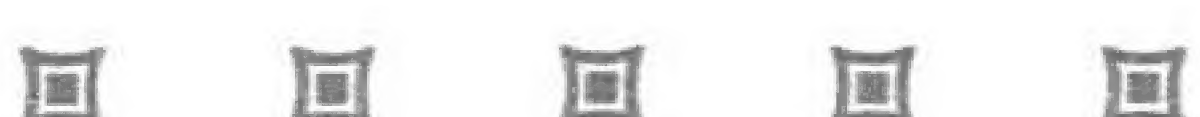


Emphasizing that the Guam project is wholly unnecessary and a waste, Colonel Theodore Roosevelt, Jr., former Governor-General of the Philippines, in a letter which he sent to the Senate committee on naval affairs, asserted that "it is fairly idiotic if authorities think that Guam is necessary for the defense of the United States against Japan."

In the event of a war between the two countries, Guam, a small island 4,000 miles from the nearest American base, immediately would fall into the enemy's hands, and everything valuable on the island would become valuable for Japan.

If, however, Congressional authorities consider Guam necessary for defense of the Philippines, then it obviously is outside of the United States defense program, for the Philippines have chosen their independence and the United States soon will be released from its obligation to defend the Islands, he said.

Colonel Roosevelt stressed that Congress should demand of the Administration a clear-cut statement of foreign policy before considering the national defense program. "Otherwise, Congress must continue to be shooting in the dark."



The German expedition to Tibet, headed by Dr. Ernst Schaefer, which will make an extensive scientific survey of "the roof of the world," has arrived in Lhasa, ancient Tibetan capital, after an arduous overland trek from Sikkim, Bengal, via the Himalayas, according to a letter, dated February 10, from the expedition.

The letter indicates that the expedition succeeded in winning the friendship of a notably reserved tribe of Tibetans in a remarkably short time. Dr. Berg, the expedition's physician, has become family doctor to a score of Tibetan nobles, while the party's cameraman, Mr. Krause, is now engaged in making films of Tibet on a scale never duplicated before. These films will be of inestimable value and interest to the world. The expedition, it was further revealed, may be allowed to visit Yalung Podrang, one of the oldest Tibetan capitals, where no white man has yet set foot.



A lot of half-baked thinking is now being congealed in public print, spouted into the microphones, and shouted from the lecture platforms on the subject of democracies versus the dictatorships, says an editorial writer in *Editor and Publisher* in its issue of February 4.

So shrill and voluminous has it become that many people in the United States are convinced that sooner or later, perhaps sooner, this country will have to enter a war on behalf of the democracies.

Clever propagandists, working night and day, have succeeded in playing upon our love of democracy—which we do love—to

convince millions that we have a prime stake in what happens in Europe at the present time. So expertly have they worked that the average person believes that a battle line is drawn, Dictatorships vs. Democracies, and that the kickoff is near.

That is baloney.

President Roosevelt has dangerously entered the situation with his plan to arm "the democracies." He gives credence to the words of the perhaps sincere, but misguided, propagandists.

A few simple facts are plain:

England and France, living next door to the dictatorships, have done little to curb their rise.

England and France, owing the U.S. billions of dollars from a previous war to make the world safe for democracy, have not even found the money properly to arm to face the dictatorships aggressively.

Germany as a nation has done nothing to affront the U.S. as a nation, yet each country has withdrawn its Ambassador from the other.

The dictatorships, having stolen second and third, with two of the world's great democracies watching, are to be prevented from stealing home by the U.S., God knows why!

We hear supposedly intelligent men in high places say that a new philosophy rules the world... the philosophy of force. We must spend billions to meet this brand new philosophy. One would think from listening to these oracles that England and France obtained their present plethora of possessions by playing checkers.

The simple fact is that the same old game is being played, but the force happens to now lie in the hands of different players.

The U.S. is not involved, and its journalists, lecturers and radio commentators should temper their abundant sympathies by studying our participation in the last war, what we got out of it, and what became of "democracy."

We feel that many of the present commentators who are making a good living by hating the dictatorships were in knee pants at the time.

The same old gold brick is being peddled again. We are again to "make the world safe for democracy."

Our simple plea is this. Keep cool and let England and France do what they will in behalf of their own interests. Our sympathies are strong, we are determined that democracy shall survive, but we in the U.S. are far from a test by war.

In view of Munich, our wisest course seems to be to arm only for defense, and make now an unalterable decision as to what possessions of England and France we are willing to sacrifice to appease the demands of the dictators.



The German Junker plane which plans a goodwill flight from Berlin to Tokyo within the near future, yesterday was given official permission by the Aviation Bureau to use the so-called southern route, according to Domei. The permission was transmitted to the German Embassy and was granted after negotiations between the War and Navy Ministries and the Communications Ministry.

The plane will fly to Tachikawa via Hanoi, Fort Bayard, Hongkong, Taikoku, Naha and Fukuoka. It is said to be the first time that a foreign plane has been allowed to fly over Naha, in the Loochoos, and Fukuoka.



The Report issued by the Imperial Shipping Committee on British Shipping in the Orient (H.M. Stationery Office, 1s. 6d. net) is a depressing document for those who recall the part played by Britain as a seafaring nation. It must be contrasted with Japan's plans for vast expansion of merchant shipping.

The *North-China Daily News* of February 16, reports, for example:—"Two highly significant shipping bills are shortly to be laid before the Japanese House of Representatives, one for control and co-ordination of the shipping trade, and the other for heavier subsidization of new construction. These plans have just been put into their final shape by the Legislative Bureau of the Cabinet, and will soon be turned over to the Diet."

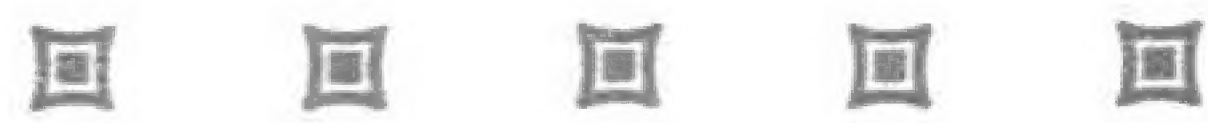
"Whether the present war with China will be as fruitful as the past wars has still to be seen, but that it will mark a definite turning point in Japan's shipping trade can hardly be doubted."

If the optimism that is seen in some quarters is well founded, the shipping industry of Japan is evidently to enter upon a new stage of development upon the return of peace."

Commenting on the Imperial Committee's suggestions, the *Birmingham Post*, March 11 issue, says:—"Better and closer co-operation between competing British lines, a wiser and more generous policy from this 'United Front' of shipowners, Government measures to make Dominions like India and Australia realize the menace of Japan's shipping, substantial State assistance to enable the shipping companies to modernize their fleets—all these things are obviously desirable and may soon be found imperative. Are they enough?"

"We take leave to doubt it.

"Unless and until Great Britain has come to some reasonable composition with Japan, no subsidy and no arrangement with the Dominions is likely to bring back even what we can reasonably hope to keep of our China Sea carrying trade."

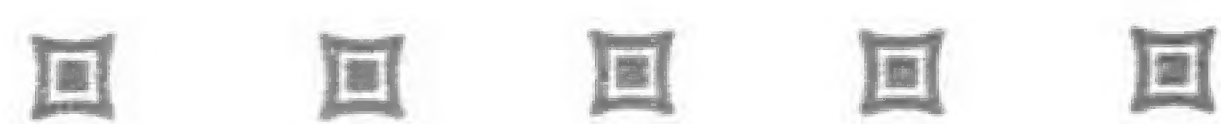


Mr. Yoshisuke Aikawa, president of the Manchuria Industrial Development Company, returning to Hsinking from Japan, revealed that a factory for making airplanes on a large scale will be established in Mukden by the Manchuria Aircraft Manufacturing Company. The amount of money to be spent for its construction has not yet been decided, he said.

He spoke of starting an automobile manufacturing concern but failed to disclose any detailed program, saying merely that the proposed concern will be based on the five-year industrial program of Manchoukuo.

To increase the output of aluminum, the existing factory at Antung of the Manchuria Light Metal Company will be enlarged, he said.

According to Mr. Aikawa, his company will spend an additional ¥350,000,000 during the current year, of which ¥150,000,000 will be obtained in Japan and the remainder in Manchoukuo.



The Japanese War Minister Lieut.-General Seishiro Itagaki said that the advance of the Japanese heavy industry to the Asiatic continent is highly necessary for the sake of her national defense, in his reply to a question asked by Ichiro Kono of the Seiyukai.

Following the War Minister, Navy Minister Admiral Mitsumasa Yonai said that the permanent stationing of a large military strength in the continent is by no means incompatible with the national defense plans of the navy.

Salient points of the War Minister's reply are as follows:

"1. Japan will station a considerable military strength on the continent.

"2. In view of the strained international situation of late, it is highly necessary for the sake of national defense to promote the heavy industry in Manchoukuo to a certain extent, to ensure self-sufficiency of military supplies in the continent in case an emergency arises.

"3. To protect the continental heavy industry from enemy attack, the authorities have already worked out plans to make it safe by establishing defense facilities and by adjusting the locations of the heavy industrial centers."

It will be recalled that the War Minister has revealed, through his replies in the Diet, the plans (1) to establish permanent barracks on the continent, (2) to establish military educational organs there, and (3) to make the continent self-sufficient in foods.

The plan for the promotion of heavy industry on the continent, as revealed by the War Minister on March 16, goes a step further, representing the fundamental policy of the Imperial army *vis-à-vis* the Asiatic continent.

The plan also reflects the position of Manchoukuo in the view of the Japanese government which refuses to consider the continental Empire as Japan's colony or to make her a supplier of raw materials to Japan and a market for Japanese goods.

The War Minister's reply, moreover, is construed to be a clear-cut expression of the "Itagaki ideology" that the promotion of heavy industry in Manchoukuo will contribute much toward intimidating Soviet Russia.

With the completion of ingenious artificial hands, armless servicemen will hereafter be able to earn their living as watch repairers and farmers with practically no handicaps.

These specially-contrived artificial hands were demonstrated for the first time by two servicemen at the Keiseisha in Tokyo recently.

Demonstrators were:

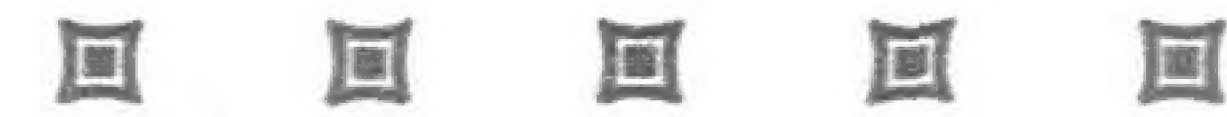
Superior Private Naoji Ikawa, 24, a native of Niigata prefecture, who lost practically all the fingers on his left hand in a battle near Taiyuan in November, 1937. He demonstrated watch mending.

Corporal Shoyu Itoi, 24, of Yamada-mura, Yosa-gun, Kyoto prefecture, who lost his right forearm in a clash near Nanking in December of the same year. He demonstrated the use of agricultural implements and drove nails with a hammer.

Those witnessing the demonstrations were impressed with the ingenuity of the new artificial hands and their accessories.

Returning to their own homes, these two war heroes will soon repair watches and farm.

Following the decision of the Board for Welfare of War Wounded to give gratis artificial appendages to the war wounded, the Osaka and Fukuoka Offices for guiding the war wounded, and the Keiseisha, a corporation of Tokyo, have been active in the production of various kinds of artificial hands and accessories for various purposes.



A plea for America to mind her own business in international affairs was voiced by Maj.-Gen. George van Horn Moseley, U.S.A., retired, of Atlanta, Ga., in an address before the Republican State Committee of Indiana recently.

Gen. Moseley scored Administration leaders for entering a "name-calling contest" with German officials and urged that this country make peace with Japan.

"While we all abhor the brutal treatment accorded to refugees in Germany," he said, "we do not alleviate their sufferings by entering a name-calling contest with German leaders.

"I have three sons and I do not want them led to war to sustain a Cabinet officer in his choice vocabulary. Although I hold no brief for Mr. Hitler, I would much prefer to have him release a barrage of names that would accurately describe that same particular Cabinet officer."

Assailing purported international policies of the Roosevelt administration, Gen. Moseley said:

"Let us mind our own business for a while and clear up the mess at home.

"With Japan absorbed in conquering China and in neutralizing the Far Eastern forces of Russia; with the balance of power in Europe so nearly equal, where is there an ounce of military or naval strength free to threaten us?"

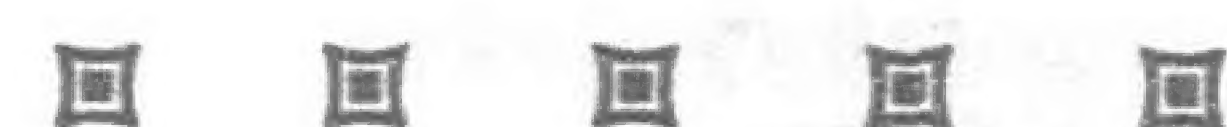
"To-day we have three great interests. First, in the problems of the Far East; second, in the problems of Europe, and third, in the problems of Pan-America and at home.

"The American people have made it very clear on numerous occasions that we are not going to war to sustain the open door policy. Nor are we going to war to save our friends, the Chinese.

"Further, we are not assisting in the solution of that problem by irritating Japan and in informing her how we believe she should run her own affairs. That is very poor diplomacy.

"It is very bad naval strategy to make faces and call bad names at one and the same time across both the Atlantic and Pacific unless we plan to build a two-sea fleet.

"It would be far better to take advantage of the situation now presented in the Far East and make an enduring peace with Japan, thus releasing our entire fleet for duty in the Atlantic, where we may need it."



As a warning against a possible German invasion, Marshal Klementi E. Voroshilov, Soviet Defense Commissar, declared that Russia's peacetime army strength exceeds two and one half million men.

The statement was contained in a speech made before the 18th Communist Party Congress.

Commissar Voroshilov declared that the Soviet army's warplane fleet is now able to carry 6,000 tons of bombs at one mass flight and that it is prepared at any moment to fight invasion.

He did not mention Germany specifically, but added that the Russian army's size has been doubled since 1934. In view of the present world armament race, he asserted, the Soviet army has been compelled to abandon its former organization by territories and has become an entirely professional organization trained in the "spirit of internationalism."

The commissar's announcement apparently means that the separate divisions of the Soviet Far Eastern army have been brought under one high command.



Reports of new fortifications and increased military forces in French Indo-China have aroused a growing opinion in Japan in favor of abrogating the Franco-Japanese agreement of 1905 relating to military matters in the Far East, according to the *Kokumin*.

It is considered, says the newspaper, that France already has abrogated the treaty with its recently announced intention to construct a naval base at Cam Ranh Bay, on the eastern coast of Indo-China. Many Government and private quarters in Tokyo are said therefore to favor outright renunciation of the agreement.

The French move is attributed to nervousness over Japan's occupation of Hainan Island. Soon after the occupation, the French Government announced expropriation of land on the bay for fortifications.

France is believed to have been inclined to abrogate the 1905 treaty ever since the outbreak of the Manchurian incident, although it has made no overt move in that direction until now. The French view is said to be that the treaty no longer exists because of Japan's campaign in China. On this ground, says the *Kokumin*, France has been supplying arms to the Chiang Kai-shek regime.

In further substantiation of reports of French arms expansion in Indo-China, the *Kokumin* says that the vice-chairman of the Chamber of Deputies' naval affairs committee recently made a three-months inspection tour of the Asiatic colony, devoting his entire attention to the question of defenses.

Following a conference in Hanoi on strengthening the defenses especially along the eastern coast, a bill embodying the decisions of the conference is reported to have been submitted to the Chamber of Deputies. This bill is said to provide for the formation of a strong French Far Eastern fleet, including submarines and airplanes.

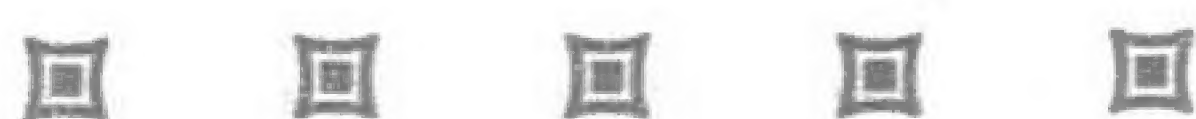
It was announced on February 13, that the defense appropriation for Indo-China amounted to 300,000,000 francs, and on February 25, the Governor-General of Indo-China decreed that none but French warships henceforth might enter the Bay of Cam Ranh.



The technical laboratory staff of the Japan Broadcasting Association plans to conduct short-distance television tests within its grounds at Kamata, Setagaya Ward, before engaging in a series of more extensive experimental tests in April in co-operation with local department stores.

Under the direction of Professor Kenjiro Takayanagi, says the *Nichi Nichi*, technicians have completed a number of the receivers which will be required for the projected trials. As a result of a system called inter-laced scanning, by which 25 images are transmitted in a second, flickering is said to have been eliminated to a great extent and the images are received and projected clearly on a screen about four inches square. The received image can also be enlarged on a screen about three feet square. All apparatus used is said to have been produced in Japan.

Following the preliminary tests, officials will erect receiving sets in various department stores, which will receive experimental transmissions from the laboratory studios, which already have three television cameras for their tests.



Friction between Japanese and American forces in the International Settlement in Shanghai prompted two Senators on March 18 to demand the withdrawal of all United States troops from the Orient.

At the same time it was revealed that the State and War Departments were divided in their opinions on such a step.

Senator J. Hamilton Lewis, Democrat of Illinois, and Senator Robert R. Reynolds, Democrat of North Carolina, launched the move for the withdrawal of American forces from China.

They said that the presence of American forces in the war zones of China is a "threat to peace." They pointed out that the United States commercial stake in China is too small to warrant the presence of American troops there.

Senator David I. Walsh, Democrat of Massachusetts and chairman of the naval affairs committee, challenged the demands of Senator Lewis and Senator Reynolds. He asserted that the withdrawal of American forces from China would violate international agreements and leave United States citizens in China unprotected.

The recall of American forces from China, Senator Walsh pointed out, would be "tantamount to withdrawing policemen from the streets of Washington and expecting law and order to continue as before. We have definite obligations in the International Settlement of Shanghai."

"The whole of China is not worth spilling the blood of a single son of a United States mother," Senator Reynolds said.

He added that United States investments in China amount to only \$240,000,000.

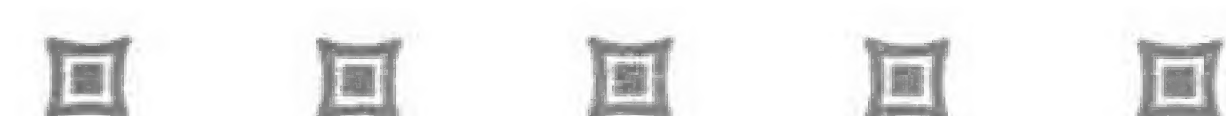
"In order to protect this investment," he continued, "we have to maintain troops in China. This might lead to considerable embarrassment, trouble and possible embroilment."

Senator Lewis revealed the existence of some conflict between the State and War Departments. He said the two departments do not agree on the American policy regarding China.

The War Department wants American troops to be withdrawn from China, while the State Department insists that they be maintained to protect American nationals, Senator Lewis said.

Senator William H. King, Democrat of Utah, took up the cudgels for the maintenance of American forces in China.

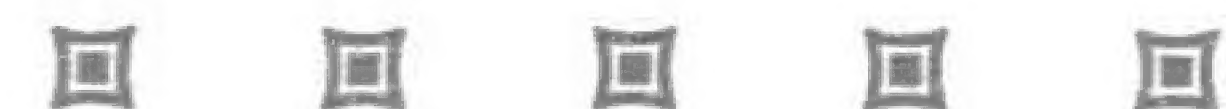
"The mere presence of United States marines tends to check the cruel and ruthless prosecution of war," Senator King commented. "Further, we have nationals and property in China which should be protected."



The city of Rome is presenting 1,000 young Italian pine trees to the city of Tokyo on exchange for the gift of 2,000 cherry trees made last year in commemoration of Italy's participation in the anti-Comintern pact, reports the *Hochi*.

The Italian Ambassador, Mr. Giacinto Auriti, notified the Foreign Office that the trees will reach Shanghai by the *Victoria*. There they will be transferred to the *Suwa Maru*, which was expected at Yokohama on April 4.

The young trees will be planted in an appropriate place in the capital which will be called either Roma Dori or the Rome En.



Various types of gas-proof chambers were subjected to tests by the Osaka municipal authorities at the Higashi girls' high school, Osaka, Friday afternoon, March 17. The city proposes to build before 1941 a sufficient number of chambers to protect the citizen from poison gas raids.

Mitsuji Nakai, deputy mayor of Osaka, Chief Okada of the air defense section of the Osaka municipal office, Chief Fujioka of the repair section of the Osaka prefectural office, and 50 air defense experts connected with the Osaka prefectural and municipal offices carried out the tests.

They examined the merits and defects of the hermetically sealed chambers, sealed high-pressure air chambers, and unsealed high-pressure air chambers.

Hermetically sealed chambers are widely in use in European countries, but since the air within becomes impure in a short time, they are not suitable for large groups of people.

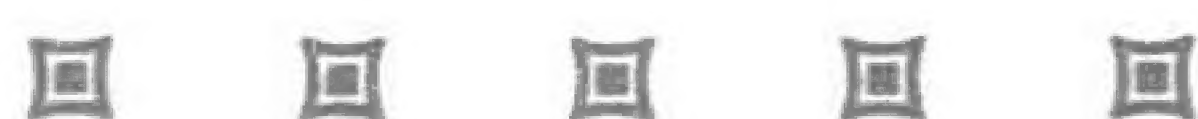
The party centered its experiments on sealed and unsealed high-pressure chambers, using the kitchen in the basement of the school building.

First they sealed every opening in the room and pumped air in for 15 minutes, meanwhile filling the rooms and corridors surrounding the kitchen with smoke. At the end of the 15 minutes they stopped the air pumps and observed how long the high-pressure air within the room would keep out the smoke.

Later they unsealed the room and started the air pumps again in order to see how well the air flowing out of the high-pressure room kept the smoke from coming in.

The effect on human bodies within each type of anti-gas chamber was also recorded. The air defense experts are now making a comparative study of the merits and defects of the various types of chambers.

Since these types of chambers can be constructed within the home of every citizen at very small expense, the result of the experiment is awaited with great interest by the public.



In December, 1937, the pride of the American merchant marine, the *President Hoover*, belonging to the Dollar Steamship Line (now the American President Lines), ran aground off the coast of the Kashoto island at the southern tip of Taiwan in the South China Sea.

On March 8, the Kobe Steel Works completed arrangements to take over what is left of the stripped derelict at the reported cost of Y.300,000.

Negotiations for the purchase of the ship which was formerly a giant luxury liner, but which had been stripped of its luxurious furnishings long since, had been going on between the Kobe Steel Works and J. Brandt of Aall and Co. of Kobe, Japanese representatives for M. Young and Co., agents for Lloyds.

The Lloyds interests, in an effort to salvage part of the loss incurred in the wreck of the *President Hoover*, which was insured by the British concern, has decided to sell the ship as scrap, an offer which the Japanese immediately took up.

The iron, nickel, and brass which were used in the construction of the ship will be reclaimed and used again.

The Finance Office has given its approval of the purchase on the condition that the steel works deposit the purchase price in the Yokohama Specie Bank until after the reclaiming operations have been completed.



The Philippines Commonwealth is telling its young men to go south and grow up with the country.

A migration aimed at putting 500,000 Filipinos on settlements in Mindanao Island has been started under the direction of the semi-autonomous Government that the United States gave to the Philippines three and a half years ago.

Aims of the colonization project, in which Jewish refugees from central Europe may participate to a limited extent, are manifold. They include:

1. Stabilization of Philippines economy, which has been maintained under artificial balance during American occupation of the Philippines.

2. Expansion of agricultural production in an archipelago that for decades has not produced enough staple foodstuffs to support its own population.

3. Development of vast tropical resources which have remained virtually untouched in Mindanao, while the northern islands have been more intensively developed.

4. Abolition of the political-religious barrier that hitherto has separated Mohammedan Mindanao from the Christian northern islands.

Test for Filipinos

Developments of the island—three times as large as Belgium but with less than a fifth the population—will be a big job. It will test the sinew of a Filipino generation in which teachings about American progress and industry have been superimposed on a background of centuries of tropical indolence.

To a certain extent, the job may show whether the present Filipino generation is made of the stuff required to develop and protect an independent nation. The Philippines are to become fully independent July 4, 1946.

President Manuel Quezon foresees the admission of up to 10,000 Jewish refugees to the Philippines within the next 10 years, and it is planned to send many of them to Mindanao. Jewish technicians, skilled laborers and artisans particularly would be encouraged to help in colonization plan. Repatriated Filipinos from the United States also will be encouraged to "go south."

The first group of settlers—about 100 persons including farmers, a physician, a nurse, a carpenter, an irrigation engineer and other

technicians—is busy opening up the Koronadal valley in Cotabato province.

They were taken from northern communities to Mindanao at Government expense and set to work building homes and clearing land under the direction of Major-General Panlino Santos, former Philippine Army Chief-of-Staff commissioned to supervise the colonization.

The original colonization plan was drawn up by an American economic adviser to the Commonwealth Government, Dr. Frederic C. Howe.



The sea Powers of the world seem to be engaged in keen competition in mercantile shipping, as well as in warship building.

According to the annual report of the *Chamber of Shipping* released in London on March 1, shipping concerns in 28 countries were receiving subsidies from their Governments.

Besides describing how Germany, Italy, France and Soviet Russia were endeavoring to use their own ships for the transport of goods imported or exported, the report referred to Japanese shipping, and said, it is evident that as soon as Japan's shipping tonnage is freed following the Far Eastern hostilities, she will launch an unprecedented shipping drive on all world markets.

Just as the sudden expansion of Japanese exports several years ago was erroneously ascribed to subsidies, currency depreciation and lower standards of living, these factors were again cited as enabling Japanese ships to operate at a considerably lower cost than British vessels, in the report of the Imperial Shipping Committee released in London on March 11.

Japan's share of Orient trade via the Panama, states the report, has risen to about two-fifths of the total, while the British share has fallen from one-third to one-fifth and the American share from one-third to one-eighth.

The report urges better equipment for British ships to compete more effectively with foreign lines for passengers and a greater devolution of management, including more authority for Eastern representatives.

"The issues involved," it states, "concern naval and economic defence in time of peace and war."

"What Singapore is to the Navy Air Force, that is what markets in the Orient are to the mercantile marine."

The *Times* devoted a lengthy editorial to the report and stated in part. "A factor of even greater importance (than subsidies, etc.) is the high degree of organization and integration which are characteristic of the whole economic life of Japan. From this effective control of various commercial and industrial interests, Japanese shipowners derive an immense reserve of power."

While the above mentioned two reports were reticent about American competition, the Americans seem to regard British competition as not ignorable. Mr. Joseph R. Sheehan, President of the American President Lines, repeatedly cited on the West Coast and in New York Japanese competition in the Pacific and British competition in the Atlantic as being typical of what American shipping is up against.

"Our present competitors are British and Japanese companies," he said, "I need hardly tell you of the great support that both British and Japanese Governments give to their shipping."

A Japanese Government official revealed at the Diet on March 14, that the aggregate tonnage of the Japanese Mercantile Marine for 1942 would be 7,500,000 tons. Japanese merchant vessels with displacements over 1,000 tons totalled 1,169 and aggregated 4,941,000 last year. Building slips for vessels displacing over 1,000 tons throughout Japan totalled 97, with an annual building capacity estimated at 800,000 tons.



A subsidiary company of the famous French automobile firm of Renault is preparing to establish a trucking service between Hanoi and Chungking, according to a United Press report of March 15.

The company plans to use new caterpillar tread trucks with Diesel engines. The trucks are capable of carrying loads of six and seven tons and are able to convey these heavy loads over mountain roads at the speed of 20 miles an hour.

Thirty trucks have already been assembled at Hanoi and more such trucks are expected to be put together in the near future. The Chinese Government is buying some of the trucks, although the French company is to operate the remainder of the fleet.

The Theory of The Co-operative Body of East Asia

By Y. YAMAZAKI, Director of Yamazaki Economic Research Bureau

Part I.—The Historical Feature of the China Incident

(i) THE TREND OF WORLD HISTORY AFTER THE EUROPEAN WAR

VIEWED from varied angles, the world war was a turning point in history. The war caused retreat or downfall of some representative capitalistic powers in Europe, the rise of the capitalistic countries outside of Europe, including the U.S.A., the development of racial revolutionary movements in, and industrialization of, the colonial or semi-colonial countries in Asia, Africa and South America. The notable examples in the last case are China and India where revolutionary movements made marked progress, and Japan, the only modern independent State in Asia, which has enhanced her international position, and has achieved great capitalistic development. In short, the system developed under the influence of capitalistic Europe disintegrated, and out of the confusion and turmoil accompanying the disintegration there has emerged a movement for the creation of a new order of the world.

In the post-war period of twenty years the international revolutionary tendency, which began immediately when the war began to subside, developed into reconstruction works in the devastated areas in Europe, while industrial revolutions took place in the U.S.A., Germany, Britain and other lands,—all these served to stimulate purchasing power, and caused a kind of boom everywhere. Indeed, the short period commencing with 1925 presented temporary stability, social and economic. In 1929, however, the panic in the U.S.A., spread like wildfire throughout the world. In order to minimize effects of the panic the powers were obliged to enforce measures which resulted in contradictions destined to be enlarged and intensified with the progress of time. Controlled economy, which is not rooted in liberalism, the *bloc* economy, restriction of agricultural production, artificial depreciation of exchange, expansion of armament, all these measures reacting one upon another temporarily brought forth a revival of world economic prosperity after the economic depression had touched bottom in 1932-33, although it must be admitted that this economic revival was but a limping one. These measures, more especially outlay for rearmament, simply intensified fundamental contradictions which are taking shape in political, economic and social crises throughout the world. The deadlock of capitalism has threatened many States and races with an endless cycle of an anticipated world war or an anticipated world-wide economic panic.

Amidst such world crises the movement for re-orientation of a world system has gained urgency and intensification. Economics of the powers have assumed more independence through control of political expedients. Although the powers have adopted a *bloc* policy to assure self-supply of materials, they are striving to unite neighboring races for the ever-increasing inequality of economic development among the nations has evoked a movement for uniting the states and races which are geographically adjacent and culturally, economically and politically related. This is the essence of nationalism which now has such a vogue. It is nothing but a centrifugal movement with a view to carrying out the still greater world-wide centripetal movement, and it is far from being an anti-foreign "ism." Thus races and states, their historic traditions, customs and manners and their cultures, have more important rôles as factors in the reconstruction of the world. Now it is intended that the intelligentsia and internationalism are not to assume ascendancy over these factors; they only have their *raison d'être* as forming peculiar characteristics within the precincts of the whole structure.

(ii) THE SIGNIFICANCE OF THE MANCHURIAN AND CHINA INCIDENTS

The Manchurian Incident, and the China Incident, which evolved as a consequence, constitute most important factors of the new world crisis and the establishment of a new world order. The real nature of the Manchurian incident was not disclosed as it was veiled by peculiar duplicated factors, and the same may be said of the China Incident so long as it was confined to North

China. When the China Incident developed to its present dimensions it began to be seen as an unavoidable phenomenon destined to occur sooner or later. The essential factors constituting the China Incident involve at least four forces, each with its own historic foundation. The first force was the Kuomintang's self-consciousness and influence based on Sun Yat-sen's Three People's Principles to make China a modern liberal state with Chinese capital, and to treat Japan on equal footing with the European and American countries. The second force is the self-consciousness and influence of Britain and other Western powers professing liberalism and capitalism, which want to secure their rights and interests, products of their early imperialistic invasion, by ensuring the subordination of China to Eastern Europe. The third force is the self-consciousness and influence of the U.S.S.R., the Comintern, and the Chinese Communist Party which want to bring China into the orbit of the communistic bloc, and thus to protect themselves in an indirect way. The fourth force is the self-consciousness and influence of the Japanese nation which understanding the related positions of the Asiatic nations as opposed to the other three forces, and also feeling by intuition the historic probability of the liberation of an Asia built on a new order in East Asia, is fighting against the other three opposing forces. The China Incident is Japan's challenge to these three forces. It is a struggle deeply rooted in the theory, doctrine, and ideology for the establishment of a new world order. It is destined to be a prolonged war, or rather a movement making history accompanied by warfare. Since the China Incident was an inevitable consequence of the new procedure in East Asia begun by the Manchurian Incident, it is necessary to go back to the Manchurian Incident in order to study the China Incident itself.

Some publicists in explaining the cause of the Manchurian Incident point to the world panic and bloc economics reacting on the economic structure of Japan. This explanation is more abstract than real. The positive factor which caused the Manchurian Incident was the rising racialism in China.

(a) *The growth of Chinese racialism.*—The Chinese revolution which was rampant in 1926-7 had for its object racial unity, and the establishment of a modern independent state by sweeping aside feudalistic war-lords who were manipulated by the Imperialistic powers, and by socially liberating China from the old-fashioned socialistic structure dominated by local plutocrats. In the process of this revolution China first collided with Britain, then with Japan. When Chiang Kai-shek established the Nanking Government the Chinese revolution was split. The main school of racialism was then guided by the regime of the British sponsored Chiang Kai-shek government representing a newly-created capitalism, and the feudalistic landlords. They completed the subjugation of the North with Chang Hsueh-liang joining the Kuomintang. Then they began to follow a policy of attacking the South Manchuria Railway, driving away Korean farmers and introducing southern Chinese capital into Manchuria, with the ultimate object of expelling all Japanese influence from Manchuria.

(b) *Japanese racialism retorts.*—Japan could not afford to lose her rights and interests in Manchuria which she had acquired through enormous sacrifices in the Russo-Japanese war. Manchuria, which was China's territory only nominally, had been developed by Japan through many years. Chiang Hsueh-liang, whose regime in Manchuria was reactionary and backward, infuriated the Japanese by his ungrateful attitude towards Japan. Especially his pressure on Korean peasants evoked Japan's sympathy with the weaker race. The situation also caused Japan to feel the urgency of assuring political tranquility in East Asia as well as safeguarding Japan's defence. All these factors, together with the necessity of shaping economic moves on an ever greater scale in order to cope with the *bloc* policies of the powers in the world panic, and also to overcome the economic panic in Japan, forced Japan to plan means to safeguard her existence and to shape future developments by forming an enlarged economic unit consisting of adjacent states and races. Thus the Manchurian

Incident began to take on grave significance when Japan encountered the offensive and hostile policy of China based on her racialism. It is thus that the incident has developed to its present grandiose dimensions. Of course, we must recognize that Japan's past policy of supporting one faction of war-lords against others, thus seeking to secure her own position. This policy showed insufficient recognition of the historic side of the Chinese revolution, and is responsible for having driven Chinese racialism to resort to antagonistic, anti-Japanese actions. At the same time it must be recognized that some Chinese leaders committed grave anachronistic blunders in denying Japan's nationalistic aspirations by regarding them in the same light as aggressive Imperialistic moves of Europe and America and by thinking that the Japanese could be eliminated. It may be that at first the national aspirations of Japan moved without theory or formula to achieve a higher form so they were considered to be nothing other than oppression and invasion. It must, however, be remembered that Imperialism on the one hand and aspirations of a race for continued existence on the other are different things. The latter may assume an Imperialistic appearance only when it lacks historical background. It is a superficial observation to mingle the Imperialism of European countries with Japan's aspirations which have grown amidst struggles in Asia against the European policy of squeezing simply on account of a resemblance in outward appearances.

The Manchuria and China Incidents started in the simple form of China's attack and Japan's counter-attack because the modern aspirations of Chinese and Japanese races lacked any new theory formula, and, more especially lacked able leadership for their adjustment. But those who would regard these Incidents as mere imperialistic wars should realize that obviously possess a background of historical conditions quite different from those imperialism developed in Europe from the end of the 19th to the beginning of the 20th century.

The two incidents occurred in the period when capitalism had begun to decline and when Imperialism toppling toward downfall historically, had lost impetus for further progress owing to the post-war racial revolutionary movements and to labor movements. The fact that the Incidents were started by the Japanese race, which has grown to present day stature by repelling European bondage and oppression, and by the Chinese race which is responsible for a typical racial revolutionary movement to liberate China from Imperialistic oppression, should be convincing enough that the trend and essence of the incidents are not Imperialistic.

The world had been dominated by Europe up to the 19th century, but in Asia Japan alone revolted against Europe, and attained complete independence and freedom. No other country in Asia has thus far acquired independence. As long as this state of affairs continues Japan's position is scarcely secure. In China, meanwhile, a racial liberation movement became intense, thanks to the development of the "Three People's Principles," and a similar movement was started in India, and other parts of Asia, naturally evoking utmost sympathy of Japan. In China, however, its method was quite antiquated, for it dreamed of building a state based on racialism even against Japan. Although the pressure of the European powers is declining gradually owing to their internal incompatibilities, yet it would not be difficult to continue to hold Asia under their yoke by means of their advanced natural science. Their actions have simply been restrained by Japan. Should Japan's ascendancy be suppressed, the liberation of Asia will be postponed by a century or two. At this time when free trade collapsing Japan can only continue to enjoy prosperity by uniting with other Asiatic races. The Kuomintang government's policy aiming at liberating the Chinese race by establishing a state based on racialism opposed to Japan, not to say European powers, will give a deadly blow to the cause of Japan's prosperity and interrupt the very liberation of China itself thus bringing back East Asia to the dark age when Japan had not yet attained economic liberty.

It will be understood that the security of Asiatic races depends on an indivisible whole of East Asia. The European powers and America would, in order successfully to cope with the conflicts growing within the sphere of world capitalism, monopolize their territory, rights and interests in Asia, which are the fruits of their invasion in the 18th and 19th centuries, thus forbidding the Asiatic races even to utilize their own resources for progress and liberation. And Japan is among these ill-fated races. In short, the liberation

of Asia can only be expected when the Asiatic races, as a unit, work out their own destiny. In Asia the races can be expected to attain their object of liberation by effecting a stronger unity, respecting their racial traditions and prestige. The history of Western Europe shows that the centripetal movement of medieval times gave place to the modern centrifugal movement and is now showing the possibility of once more reverting to the centripetal movement. In Asia, however, a theory and formula which can accomplish simultaneously the centrifugal and centripetal movements are demanded. Otherwise Asia cannot survive. The systems of politics, economics, and culture must be born out of this theory.

The fundamental aspirations of the Kuomintang Government for liberation of the Chinese race is worthy of the utmost sympathy, but considering all circumstances, it may be said that its attempt to attain its objective by opposing Japan was a great anachronistic blunder. Moreover, the Kuomintang Government gradually has been losing sight of the ideal for the liberation of the Chinese race by seeking to unite the "Three Principles" with a compradore capitalistic ideology. Japan, too, has not grasped the full significance of Asiatic unity. The slogans of "harmony of the races," "capitalists not admitted," which were raised immediately after the Manchurian Incident, were quite correct, but the subsequent developments which gave rise to the North China Incident disclosed the coarser ideology of Japan's ruling class making headway, thus losing the true sense of the new dawn of East Asia as opposed to European culture. This may be attributed to the fact that owing to the weak resistance of China, the low-level consciousness of the situation on the part of Japan interfered with a correct evaluation of the incident. This may be explained by a law of physics that once centrifugal power is lost, centripetal power also will be lost.

When, however, the North China Incident grew into the China Incident and the Kuomintang Government, casting off its garb of compradore capitalism, began to resist Japan with all its strength, the Japanese nation revived a true consciousness of the situation which had been dormant.

The idea that the liberation of East Asia can be achieved by converting it to communism is another force calculated to arouse Japanese combativeness. The realities and philosophic defects of the Communistic doctrine can only throw East Asia back into chaos instead of saving it, and liberating China.

The only way then to give life to the new aspirations of Asiatic races is the theory of a new "Order of East Asia" which has been born out of the purified faith of the Japanese nation.

The revolution in East Asia apparently means a disruption of the world, seeing that it is a revolt against Western Europe's tutelage. But it will be remembered that the world, which has been under the dominance of Western Europe in the 18th and 19th centuries has never been "harmonious" in the true sense of the word. Only when East Asia is liberated from Western Europe's dominance, and acquires an independent position can true harmony of the world be developed. This movement for the establishment of a new order of East Asia is, therefore, a centrifugal impulse that is only a premise of a centripetal force in world history. In this sense the necessity of co-operation between the East Asiatic races and States which share their position must be stressed.

(iii) THE PRESENT PHASE OF THE CHINA INCIDENT

Needless to say, the Manchurian Incident proved a prologue of a new chapter of world history propounding many new problems.

Racialism in China has made wonderful development through the ordeal of the Manchurian Incident. The Kuomintang Government, utilizing the anti-Japanese movement, attempted racial unification of China, and has been greatly successful. The accumulation of capital with the Chekiang financial plutocracy in the center, the successful reforms of the currency system, joining of Kwangtung and Kwangsi provinces, and North China to the central regime, both politically and economically, are the prominent features of the racial unity achieved by the Kuomintang government. The retreat of the Red Army to the Western districts in 1934 was said to have been carried out on strategic grounds, but as a matter of fact, it was simply an endorsement of the progress toward racial unity of the Chiang Kai-shek regime. This movement reached its climax with the occurrence of the Sianfu Incident of 1936 and the five years' plan for the re-establishment of the Chinese economics with a view to successfully resisting Japan.

The new features of the China Incident are the participation of Britain and the U.S., representing capitalism, in giving positive assistance to China, the joining of the Chinese Communist Party to the Kuomintang, the active participation of the Soviet Union and the Comintern through abnegation of the doctrines of class warfare and social revolution, and the rapprochement between the German-Italian bloc and Japan. Thus the Incident has become an important factor in international politics.

In Japan, too, racialism has developed a strong fighting mood, and thus, despite the policy of localizing the hostilities adopted by the Japanese authorities at the time of the North China Incident, the hostilities have gradually been extended in scope, and spread into unprecedentedly big warfare, far beyond the original intentions of both Japanese and Chinese authorities. The present fourth phase of the Incident has the following features which strongly express the real nature of the China Incident.

(a) Despite brilliant victories of the Japanese forces in several series of battles, final and absolute victory has not been achieved owing to the vast extent of land, immense population, heightening of the spirit of racialism, and the western Powers' assistance to China. It has now become clear that in future military pressure alone cannot bring the Incident to conclusion. It is only when the Chinese nation has commenced to give a new political and social turn to their racialism that the Incident can be fundamentally solved.

(b) In order to attain the final goal of the war or even merely to secure victory over the Chinese forces it has become absolutely necessary for Japan to start social construction in China either political, economic or cultural. In the vast territory under occupation of the Japanese forces close contact has been established with the Chinese masses in their daily life. A superior theory and ideology is needed, a theory higher than capitalism, communism, and the Three People's Principles. Thus the "protracted war" means protracted social construction accompanying warfare.

(c) This process not only renovates the mode of living of the Chinese, but even means the internal renovations of Japan herself in order to enable Japan successfully to cope with the long construction plan. Although Premier Konoye's statement of November 3, 1938, was too abstract it has a very deep significance as reflecting the goal of the war in the eyes of the Japanese nation.

(d) These characteristics of the China Incident present themselves even in the formulæ of the solution of the Incident.

- (1) Since the goal of the Incident is the establishment of a new order, the old formula of warfare, such as the victory or defeat in battles, conclusion of a treaty and the like will not end the Incident. A joint declaration, a codification of laws common to all may be necessary.
- (2) The situation created by the hostilities cannot be theoretically disposed of by the dictation of the conqueror. A new and fundamental relationship must be established between the two nations which deeply penetrates into their mutual fate. Redemption, and surrender of territory are out of question; on the contrary Japan must defray enormous funds for economic construction of China and for creation of a perfect modern state.
- (3) Mutual assistance for social evolution of the two races is sought in the solution. The liberation of the Chinese race from antiquated social environment, the internal reforms of Japan, establishment of a new relationship between the two races, and the renaissance of Eastern Asiatic culture will be the ultimate objectives of the Incident. Thus the Incident is not a war for the sake of conquest. It may be said to be social warfare or social revolution or a revolution of Asia accompanying warfare.

(2) The last feature of the fourth phase of the Incident is that it puts to naught capitalistic calculations or it alters an economic point of view of war. The casualties of Japanese soldiers will be tremendous, and as to war expenditure over seven billion yen will have been expended by the end of this year, and another seven billion yen will be required for the next year. The outlay of such enormous war expenditure can hardly be compensated by economic gains obtained by victory. In order to import raw materials taken from the opened resources a huge sum of capital is still needed. Labor may be cheap in China, but it cannot be utilized without paying wages. The total amount of exports China can afford at present is from ¥1,200,000,000 to 1,300,000,000

a year. Japan cannot monopolize all these exports. Moreover, Japan must export to China her manufactures in order to purchase Chinese raw materials.

Thus if the Incident is viewed from economic calculations the sacrifices are too great to justify it. Herein lies a historic feature of the gigantic warfare, a feature which cannot be explained away by a liberalist or communist point of view.

Then what is the fundamental criterion for a justifiable solution of the issue? It consists of laying before the world in the most realistic and progressive way Japan's historic mission for the solution of the issue which concerns the whole fate of Asia, and also of recognizing the existence of a positive cause in the Chinese nation's racial consciousness and in their resistance against Japan. When the impulse of life, and consciousness of her mission on the part of Japan, has squarely met the energy and consciousness of the Chinese masses, a real solution of the issue can be expected. The idea and practice of the Co-operative Body of East Asiatic races and states mean to solve this historic proposition.

Part II.—The Political Theory of the New Order of East Asia

(i) THE FORMULA OF THE ORGANIZATION OF THE NEW ORDER; JOINT DECLARATION

How can the Co-operative Body of the East Asiatic races be formed? It is not to be combined or dissolved by old fashioned treaties between states which are reminiscent of the old political thesis of liberalism, nor is it to be united or disunited at convenience of the members forming the Body, as is the case with diplomatic understanding. Just as a social and political movement takes shape through originality and acumen of a leader trusted and supported by the masses, and develops into a living political power, so the Co-operative Body of the East Asiatic races takes shape by the sagacious originality of a leading race trusted and supported by the remaining races, and ultimately serves as a driving force for re-organizing the world by a new criterion. The formation of actual co-operative relationships between the East Asiatic races will follow a formula of joint declaration of historic significance; and of course the declaration must assume that the wills of the races and states forming the Body are co-ordinated and unified by clear-cut theories and principles. The declaration must express the historic meaning of the Body, and a social doctrine based on a new conception of the world; it must be a clear manifesto regarding the world revolution which will take place through the political and social liberation of East Asia, and be an exponent of the will, system and method for carrying out the manifesto. The declaration must be quite different in essence from one in which the wills of the contracting states have no direct bearing on the life of the races. It not only regulates the relationships between the states, but also regulates the life of the masses of the contracting parties by a new doctrine, supported by the fundamental law of each state.

This declaration itself must be the highest goal of political life of the East Asiatic races, regulating political, economic, and cultural missions of the Federation and explaining the fundamental theory of the same.

(ii) THE RELATION BETWEEN THE NEW ORDER AND JAPAN'S NATIONAL POLICY

What actual relationship has the Co-operative Body of East Asia with Japan's national policy, sovereignty, and practical politics?

Any state even under a system of liberalism must be subjected to certain conditions of the system. Since the Federation of the East Asiatic states is a higher unity of states than that of any other states, and Japan participates in it as a central power with a deep consciousness of the historical destiny of East Asia, it is only proper, either practically or morally, that she should share responsibility as an organizer of the new order. Will Japan's national policy lose prestige under restrictions of the new order? Decidedly not. In Japan's national constitution the Imperial Household is the immovable center of the racial unity of the Japanese race, and of social union.

The Emperor controls politics, and is the highest existence above any responsibility for actual operations of politics. The Japanese look upon the Household as the Head Family of the

Japanese race, as the nucleus of the organic whole. Thus they intuitively respect the Emperor and the Imperial Household, and wish for its permanent existence. Their feelings about the Imperial Household are quite religious; this enables them to think it the highest honor and joy to sacrifice their lives for the Emperor. Their respect for the Head of the family and their religious affinity with the Household do not imply any social aloofness such as is witnessed in attitudes of other nations; on the contrary they are expressed in the social and state life and order of Japan. This accounts for the fact that Japan's national constitution is unique and the theory for the formation of the state is superior to any other theories on state.

When Japan participates in the new Federation of East Asia as its organizer, and assumes responsibility for it actually and morally her national constitution is an ideal worthy to be a pattern. If any critic assumes that the politics of the Federation of East Asia in which the wills of other races and states are reflected may conflict with the supreme power of the Japanese Emperor, such critic does not grasp Japan's mission, and even besmirches the dignity of Japan's national constitution.

Japan is far from any intent to subjugate another race and enforce her own constitutional form upon it. The sense of subjugation is quite foreign to Japan's national constitution. Since the Japanese nation's philosophy of national polity must be expressed as a world-wide theory in the form of the Co-operative Body of East Asia, Japanese polity itself will never be qualified by the Body. Japan leads in the creation of a new moral relationship of the world with the consciousness of her noble mission, her wise originality, and power of embodying it, although not without self-reflection as a great nation. When Japan faces other races with self-reflection worthy of a great nation, her Imperial Household will be sure to win the great trust and respect of the other races and masses.

(iii) THE HUMAN TIE OF THE NEW ORDER

The new relationships of the East Asiatic races do not presuppose enforcement of any one nation's will upon other races with no theory or principle to support it, and therefore if the above-mentioned joint declaration is made by a so-called puppet government which has no national foundation, it cannot be a driving force for producing a really great order. The joint declaration must have a spiritual tie between the nations and for that account a human tie systematized under a "thought" organization is necessary. In short, each participant state must be ruled by a national political party based on the livelihood of the nation, supported by the masses. Such parties must have common customs for the prosecution of the same goal with other participant states. By the collaboration of such racial and national political parties of the states forming the Co-operation Body of East Asia the unified co-operative organ connecting the states, which regulates the administration of each state by a fixed formula, must be formed. And all the nations must unite horizontally through various organs of their social life so as to form a human tie closely connecting the nations.

The political party above mentioned must partake of racial and national character; it must reject any class consciousness. In the formation of such a national party, however, we cannot expect much from wealthy privileged classes who enjoy happy lives and who feel incompatibilities between their daily life and the progress of the social whole. The party will have, on the contrary, great supporters in the middle classes, the intelligentsia, laborers, and peasants, not satisfied with the existing social structure, who want to be liberated from bondage of the structure, and who possess a broad consciousness. Such a party, even if supported by the masses must not be a political system which is inclined to class warfare for the special interest of the members of the party. Those who join the party must have a strong social consciousness and a strong sensitiveness to justice. They only join the party not as representatives of the social stratum which they represent, but as leaders of the national life as a whole.

The leaders who assume the great task of creating a new social structure, must excel in their qualities. They should show their ability as true leaders and organizers in political and social life with a new conception of the world, life, and moral co-operation.

The life of the masses, their volition and energy are the basic objects of politics, and form the foundation of the system of might. Even in Japan, having a peculiar national constitution, the problem

of reorganizing the nation has become acute, and by the successful solution of the problem alone can Japanese politics turn in a new direction. Policies cannot be worked out without taking into consideration the life and energy of the masses. The thought of the masses, however, is coarse, and it is always concerned with livelihood. The masses will judge social phenomena intuitively, but when they want to understand higher ideals, and systematic thought, they do so through concrete facts. The thinking faculty of the masses has a limit, and they cannot be expected to have an ability for formularizing or theorizing, nor can they correct social contradictions. In this sense the ability of the masses has a limit, and it is a mistake to overestimate it. Despite all these handicaps the masses have volition and energy without the help of which any political creation is well-nigh impossible.

The real capacity of a great statesman of the present age, therefore, consists of his ability for effectively organizing the volition and energy of the masses. The reason why a national political party must be based on the masses is that the necessity of imbuing the lower strata of the nation with the leaders' real intentions is felt more keenly now than in any other past age. When nations grasp the real will of leaders whom they trust their volition will be given a sudden impulse and call for energy. When the leaders feel the mental struggles of the masses as their own, and strive to realize higher and nobler ideals without losing sight of the synthesized demands of the masses, a really superior leadership will appear.

In the Soviet Union the leaders adhere to an extreme despotic rule, shutting the eyes of the nation to actual conditions of the country and the world. This despotism, together with its peculiar form of rule, serves to spread among the masses distrust, fear, hatred, and demoralizes the nation. The leaders commit a great blunder in executing a formularized theory without considering in the least the demands of the masses. In trying to rectify one blunder they commit another and repeat it forever. Thus any well-intentioned formula of rule results in committing sins.

In the case of Japan, too, if the leaders had made clear at the beginning of the China Incident the object of the hostilities, giving conditions for ending them, and reorganizing national economics, the nation might have sooner been ready to face the grave situation, and could have conquered present difficulties in a more appropriate way, and with fewer sacrifices, in short the nation might have been able to mobilize greater energy for realization of the nation's ideal.

(iv) THE FORM OF POLITICAL INSTITUTION UNDER THE NEW ORDER

The majority system in present-day politics is a product of the Democratic age which called for the doctrine of Social contracts regarding a society as the mechanical assemblage of individual lives; it is a method for deciding matters by the number of voters in order that the newly risen lower and middle classes can successfully resist old forces. As long as capitalism had a revolutionary meaning as opposed to feudalism the majority system possessed power to lift up society. Now that the social structure has become complicated, and it has become imperative to bestow on it a unified character the system standing on formal Democracy has become either a despotic means of the strong or of the plutocracy. It has entirely lost the progressive value it possessed in the period of its development. Political leaders must, therefore, achieve new and genuine politics by which to dissipate the social incompatibilities which are presenting themselves, and in doing so they must not lose sight of the generalized demands of the nation.

The formula of the politics of the new age is not essentially different from that for representative government, but it cannot follow the antiquated form of formal democracy or a majority system. Instead of that a new method will be adopted by which the demands of the nation will be generalized and be reflected on the center organs of politics, and the government's will will be understood by the nation; in short, the new method will put stress on practical politics. By this method a functional representative system will be fully operated.

Considering its essential nature, the functional representative system will greatly limit the operations of a majority system. In the politics of a genuine totalitarian state the representatives of the nation do not necessarily represent the interests of the nation, but their main function, lies in the fact that they express opinions, as representatives of every function, about various formulas included in the synthetical whole. In these circumstances the

operation of a majority system are greatly restricted. Especially in the preparatory period for building up of a new order representative and important government officials must be those who belong to the newly rising political force with a clear-cut ideology so that arguments by factional interests, or a majority system will lose their *raison d'être*.

With a great change in the central governmental structure various administrative organs will be rearranged so as to fully display efficiency. In this way the demands of people in every nook and corner will not be left unattended. All demands will be generalized and be reflected on the central organs of politics.

In these circumstances legislation and administration are no longer independent organs one to the other. The legislative body is an organ having a direct bearing upon the administrative responsibility. The administrative body will no longer irrationally be restricted by a mechanical independence of the legislative body.

(v) WHAT FORM OUGHT THE UNIFIED POLITICAL STRUCTURE OF THE CO-OPERATIVE BODY OF EAST ASIA TO TAKE ?

In the internal relations between the units of the Body, there exists no longer diplomacy in the strict sense of the word, but the units must adopt one and the same action toward the foreign powers outside of the Body, so that diplomatic activities must be controlled by the Body. When diplomacy is controlled military action must also be controlled. By controlling diplomatic and military actions it does not mean the fusion of their organs. If the Co-operative Body of East Asia assumes the form of a Federation of East Asiatic states such fusion may be necessary, but if it is realized in the form of the coalition of the states these organs will assume an independent form outwardly, although a close liaison will exist inwardly.

Other items to be placed under general control of the Body will be agriculture and mining, industries, finance, trade, transportation and communications and the like, while those to be placed under each government will be local agriculture and industry, local transportation and communications, maintenance of peace and order, education, and administration of customs and manners, traditions and the like. In order to remove incompatibilities which may arise in financial and economic matters among the units of the Body in raising efficiency and also in order to stimulate the intermingling of cultures in the Body, it will be necessary to have a Federal government and Federal finance, otherwise satisfactory efficiency cannot be expected, but at the same time we must admit the existence of circumstances which make it difficult to form a perfect form of Federation of nations having different customs, manners, traditions, modes of living, different histories as to internal and international relations of economics. Moreover it may be said to be a real feature of the Co-operative Body of East Asia not to disregard these considerations. The most appropriate form of the Co-operative Body of East Asia will therefore be to assume in the beginning a form of a coalition of states, whose joint organ will manage the above-mentioned items in accordance with an established fundamental principle. In this case a Federal government does not exist so that the organs under the control of the Body will be owned by the participant states, only subject to the coalition organ. After the organ for control of relationships between the units is established, the holding of posts in the other states' government organs by Japanese officials shall be avoided; only advisers or engineers shall be sent if invited.

Part III.—The Economic Theory of the Co-operative Body of East Asia

The Co-operative Body of East Asia must have its own new economic theory subject to the historic and social conditions which have necessitated the birth of the Body. In the early thirties the mingling of politics with economics was generally required; for all economic activities regarding production, distribution and consumption of goods could not be left to the free utilization of private interests as in liberalistic economy, whose activities are only regulated by the impulse of seeking their own interest. The fact that the theory of interest pursuing proves obstructive to the formation of the Co-operative Body of East Asia will be understood by considering the following points.

(a) In the totalitarian state of the highest order the individuals forming it will fully display their assigned functions, and thus a great development of intelligence and impulse on the part of the individuals may be expected. The masses, however, cannot hope

to grasp intelligence and impulse if they are placed in an atmosphere in which their living is not assured, although their aspirations for the safety of the state can be evoked on extraordinary occasions such as war. It is also no easy task to make the masses behave in conformity with the leaders' moral instructions in an atmosphere which is so aloof from them. It can, however, be expected that when society begins to move towards an ideal goal the masses will intuitively be acquainted with the new principle, and co-operate for it. Then the essential condition for the realization of the goal is that the nation shall be given assurance of living. The masses when so treated by the state will begin strongly to feel their mission as an integral part of the whole of the state. When the state educates the nation, irrespective of rich and poor, according to the abilities possessed by individuals, they will understand from childhood the fact that they are individuals of the whole and not individuals for the sake of individuality. The state needs to be equipped with many superior organs in order to fully display its features as an organic whole, but in such organs the state must see that a small number of private manufacturers shall not be allowed to monopolize profits through control of production.

(b) The existing evils of liberalistic economics are that production is artificially restricted from the point of view of profit making, and finance is adapted to it, distribution is not made on a fair basis, and thus purchasing power is not brought up to the level of production, causing panic and dampening productive activities.

(c) In liberalistic economy there occurs unnecessary competition among the organs of production, and more especially those of distribution. In this way great waste of both materials and labor takes place. These evils are remedied by executing economic activities on the basis of co-operation for the whole organic entity, not on the basis of individual profits.

(d) Unfair distribution instigates evil activities for personal gains, harms the masses, and suppresses fair competition. With such evils rampant any great increase of production and productive power cannot be expected.

(e) The present economic structure is based on class distinction, formality and partisanship. This prevents individuals from showing efficiency; the principle of the fittest posts for the fittest men is not workable, and the organic whole is not developed. Such a system results in shutting out able persons when such are badly needed.

(ii) THE FIRST PRINCIPLE GUIDING THE OPERATIONS OF NEW ECONOMY

What the Co-operative Body of East Asia seeks is a controlled and planned economy, and the principle guiding such economy is that the goal of economy is not seeking of profits for individuals or a special class or classes, but must be one representing the demands of society and the state as a whole. Such demands must be those which make it impossible or unnecessary for one race to squeeze another race. It is the economic co-operation and not economic control of one member state over the other member states in the Co-operative Body that is stressed.

Another aspect of the problem is that more importance is placed on the spirit of operations and political nature of economics than the mere alteration of economic structure. In such totalitarianism lies the features of a co-operation which manifests itself in varied and different phases of society. Then what is the economic structure required to attain the above-mentioned demands? Is it to be operated by the state or by individuals under state control. Or does it take another special form? Before answering this question we must consider the fact that we must start from the "existing facts." By the "existing facts" we mean to say that there already exist factories, transportation organs, buildings and other endless productive means privately owned, and tied up to operators, engineers, workmen and the like. It is impossible to create new things by denying these existing ones even if they are very unsatisfactory. This is especially the case with Japan where capitalism is highly developed.

The life of these "existing facts" cannot be suspended in the attempt to execute social reforms. New life must be breathed into them gradually without destroying any theory contained in them which is worth retaining. It is therefore a mistake to try to create a state or private economics by a fixed formula from the beginning. The important point may be the selection of a new direction for economics. In short, the spirit of operations is of the utmost importance, and the formula is of secondary

importance. The factor deciding this spirit of operations is the character of politics, which in return is decided by historic and social factors possessed by the government. It cannot be changed or acquired freely and independently. Then it may be said that a government which has failed to lead economics to the high goal above mentioned cannot be a great leader of the nation.

(iii) THE ECONOMIC THEORY AND POLICY OF THE CO-OPERATIVE BODY OF EAST ASIA

When the economics of the Co-operative Body of East Asia assumes and develops the above spirit and direction it may boast of possessing peculiar features. In this connection the following points should be specially noted.

(1) Such economics must stand on a moral basis and human ties so that the three peoples of Japan, Manchoukuo and China may engage in their respective callings with mutual trust and confidence. To put it in another way, the causes betraying this mutual trust must be eradicated. These causes, it may be mentioned, are chiefly produced from the motives of private profits.

(2) It is necessary to rectify the conditions in which increase of production is obstructed or necessary money circulation is interrupted by ideas of private profits.

(3) It is necessary to suppress the tendency to prefer transactions with third countries to those with member states in the Body simply in order to gain private profits.

(4) It is necessary to eliminate the causes which are responsible for unfair assignment of industry and unfair distribution of income among the three states so that purchasing power is often reduced and economic depression is caused.

In short, unless the capitalistic character of economics is rectified by higher cultural intelligence and by the great will of the state, a really efficient Body of East Asia will not be born.

Then what formula must the new Body take? In case the Body assumes the form of a coalition its policy shall start from the following fundamental theory.

(a) In case first participant states are Japan, Manchoukuo and China the amount of trade and assignment of industry among the three states shall be rationalized and then by raising this rationalization to the highest degree the great increase of the amount of production and productive power will be accelerated. To explain this with a concrete example, even if Japan imports a big quantity of cotton from America the latter will not purchase from Japan a corresponding amount of merchandise. Then some portion of the expenses for American cotton must be defrayed out of money obtained by exporting cotton goods to the South Seas. Then it means so much reduction of the total amount of imports for production of goods in Japan considered as a whole. If, on the other hand, Japan imports from China cotton, wool, leather, salt, iron ores, coal, fluid fuel and others, and China imports Japanese goods with the money paid by Japan the amount of production will not only so much be increased, but Japan will be able to apply the money she obtains from exports to other countries for the import of goods China lacks. Thus an abundant supply of food can be expected, too. The same may be said from the angles of China and Manchoukuo.

Besides, various steps shall be taken such as the acceleration of exports to other countries outside of the Body or the growth of the Body's capacity for import, in addition to increasing the volume of the inter-trade among the member states; control of trade among the member states as in one state; stricter control of exporters and importers or the operation of trade by the state; not only temporary reduction of tariff but the conclusion of a customs agreement or alliance on the basis of preference duties.

(b) Monetary relationships shall be established among the three countries. The link between the yen and the Manchoukuo and Chinese currencies will eliminate changes of prices of commodities of the three states accompanying fluctuations of exchange. Not only that, but it will make the calculation of cost prices of the industries of the three countries easier, thus ensuring smooth operations of investment and trade among the three states. For this purpose readjustment of funds, and control of exchange shall be enforced to the member states as in one state. And at the same time a credit system must be created for readjusting irregularities of the balance of payments arising from trade among the member states. For instance, the products for export from North China are congested in the period from October to January. Japan

should see that they export goods to their full capacity by giving them credit.

(c) By the Co-operative Body the fittest branches of industry, mining, agriculture will be applied to the appropriate places throughout the three countries. Heavy industry in Japan which has been rapidly developed during the hostilities will be utilized after peace is restored without any political obstacles in Manchoukuo and China for the development of resources and land, and thus all abundant human power in the three countries can be mobilized to the maximum degree for contribution to the prosperity of the three nations. Needless to say, Japan's developed technique will in this case be applied on even more extended scale.

The above-mentioned measures shall be guided with the ultimate object of enhancing social justice in the Body so that individuals can have abundant and healthy life by serving to the whole Body. Without such characteristics the Co-operative Body of East Asia will be a lifeless mass.

As regards the degree and procedure for carrying this out each state will have to pay utmost attention to human training, intelligence and the like, in short, to sentiments of the masses.

Economic relations between the Co-operative Body of East Asia and other parts of the world will never be severed, but since the economics of the body must be one which is much freed from liberalism, its relationship with the economics of the outside world will have to be adjusted by political considerations and not by the economic principles of liberalism. For example, trade based on mutual reciprocity or compensation will be preferred to that based on liberalism, and in money transactions an agreement on the system of exchange liquidation will be more welcome. Such agreements with foreign countries must be considered only in relationship with the progress of political and Co-operative economics in the Body. If in this case the positions already acquired by the western powers in East Asia hamper the creation of the co-operative economics of the Body, it is inevitable for the Body to weaken or repel such positions. Such does not mean to separate East Asia from the rest of the world, but it is in conformity with the requirement that East Asia shall be given a status of independence, and with that status alone it will co-operate with other parts of the world.

Substitute Goods In Japan

Commodities made of metal, leather, rubber and other materials indispensable for the manufacturing of munitions and other war supplies will disappear almost completely from the Japanese market this year and, instead, a considerable amount of substitute goods will be placed on sale.

To increase the production of substitutes, the Commerce and Industry Ministry will greatly encourage inventions of such goods and will fix prices and standards of quality for them. Through the Substitute Goods Industrial Association, the Ministry will also appeal to the general public for the use of substitutes and will hold exhibitions at various department stores in Tokyo. The same authorities will encourage the use of school bags, stationeries, clothing, toys and other goods made of the so-called substitute materials.

"Even though there are no large battles in prospect this year, we cannot alleviate control measures for the nation must make greater efforts to conserve its material resources in coping with the situation," said Kakichi Takeuchi, Vice-director of the Material Supplies Adjustment Bureau of the Commerce and Industry Ministry.

"Under present circumstances, the promotion of foreign trade and the increased production of gold are not an easy task to realize," Mr. Takeuchi continued. "Therefore, we must take utmost caution for the preservation of materials necessary for military purposes."

For coping with the long-term construction plan as well as to keep the Japanese occupied regions free from activities of Chinese remnants, the nation must have materials, according to Mr. Takeuchi. Although control measures will further be tightened, the people are urged to endure the hardship for the sake of establishing lasting peace and new order in East Asia.

Economic Recovery in Shanghai

By TSURUMATSU OKAMOTO, Assistant Editor, The Tokyo Asahi

JAPAN'S grandiose work of establishing a new order in East Asia is progressing slowly but steadily, although many Chinese and Western critics continue to indulge in speculation as to its ultimate failure. It is commonly held that the establishment of a New Order in East Asia means the retreat of Occidental business from the economic field of China. This is an absolutely nonsensical hypothesis. Mr. Y. Yamazaki, famous economist, make this apparent in an article on the theory of the Co-operative Body of East Asia. "The theory of 'New Order'" he says, "is based on a new conception of politics and economics which has been born out of the world crisis and augmented since the economic panic of 1929. In order to cope with the situation there has emerged a movement for uniting the States and races which are geographically adjacent and culturally, economically and politically related. It is nothing but a centrifugal movement with a view to effecting a still greater world-wide centripital movement, and it is far from involving any anti-foreign 'ism.'"

Those who prophesy dwindling business for third power nationals in China after the New Order has been established often cite the case of Manchoukuo. But the participant States in the New Order have their own proper histories and traditions as regards economics as well as politics and culture. And the New Order in East Asia does not submerge all their economics. East Asia is allowed to have its own traditional economics as long as it does not obstruct the smooth working of the whole organic system of "New Order." The rights and interests of third power nationals in China, especially in central and South China, will not be eliminated, nor are they likely to be much affected once order has been established in these districts.

Even in Manchoukuo which is cited by critics as a notable example of the closed door against Western trade, Great Britain and America are doing a better trade there than they did before that country became an independent State, as Mr. Arita, Japanese Foreign Minister, asserted in his address before the Diet on January 21.

Especially the U.S.A. supplied one-eighth of Manchoukuo's imports in the period between January and April, 1938, thus attaining second place after Japan. Then, from this factual basis, it may be conjectured that in China, and more especially in Shanghai, the Western Powers will enjoy far better trade after the restoration of peace than they did before the hostilities.

That this forecast has sound basis may be ascertained as far as Shanghai is concerned on the basis of statistics showing the trade of various individual third power traders and businessmen during the past twelve months or so.

First of all take the banking business which has realized a fair net profit for 1938 despite great handicaps of the war, is shown by the following figures.

1.—Hongkong and Shanghai Bank.

This bank as Mr. T. E. Pearce, chairman, said at the annual meeting of the Hongkong and Shanghai Banking Corporation, had net profits amounting to \$15,296,621.32 after making full provision for all known losses and contingencies. To this sum is added \$3,383,004.53 brought forward from the preceding year, and thus after deducing the interim dividend of £400,000 paid at 1/2% and directors' remuneration there remains available for distribution \$12,145,172.08 which it is proposed to allocate as follows:—

To pay a final dividend of £3 per share (subject to deduction of increase tax)	.. .. .	\$7,744,537.82
Transfer to bank premises account	.. .. .	1,000,000.00
Carry forward to new account	.. .. .	3,400,172.08
		<u>\$12,144,709.90</u>

2.—Chartered Bank of India, Australia and China.

At the annual general meeting in London on March 29 the chairman, Mr. A. d'Anyers Willis, reported net profits of the year

to be £335,309 against £491,065 for the preceding year, explaining, however, that the decrease of approximately £156,000 resulted because in the £335,309 is included a transfer from contingencies account to cover depreciation on Government securities.

The Directors recommended a final dividend at rate of ten per cent per annum subject to income tax, carrying forward £179,094 8s. 2d., £35,000 to be added to pension fund.

According to the *Financial Times* in London, a reduction in the accounts is due to fluctuation in the sterling value of the Chinese dollar. The *Financial News* also says that the technical factor in the depreciation in deposits of Chinese exchange has accounted for practically the whole drop in the Chartered Bank's current accounts.

3.—China Finance Corporation.

A net profit of \$75,813.85 for business operations during 1938 was reported by Mr. R. H. Parker, President, at the annual meeting held in March. The chairman made the following remarks:

Earnings: In spite of the many difficulties confronting finance and other companies during the past twelve months, we are pleased to be able to report a successful year resulting in a net profit from operations of \$75,813.85.

Reserves: Out of this working profit of \$75,813.85 your Directors decided to transfer the sum of \$71,060.51 to reserves in order to provide for any possible losses on several doubtful accounts. The balance sheet now shows a total reserve of \$443,174.47.

Loans: For the year under review loans amounted to \$913,872.86 as compared with \$888,183.55 in 1937 and \$531,540.62 in 1936.

This total must be considered satisfactory in view of the severe curtailment of business in April due to the fall in exchange.

Foreign Currencies: In order to offset to some extent the possibility of loss from a further depreciation in the local currency, a certain proportion of loans has been made in United States dollars and in pounds sterling.

Outlook: Although trade in general appears depressed, prospects in our line of business would seem to be more encouraging than they did a year ago, and as soon as conditions in the Far East return to normal, your Corporation will no doubt be in a position fully to participate in the recovery for which we hope.

4.—The Mercantile Bank of India, Ltd.

The Bank recommended the payment of a final dividend of six per cent, less income tax, making 12 per cent for the year. It is also proposed that £20,000 shall be written off Landed and House Property and £30,000 placed to Contingencies Account leaving £177,770 to be carried forward.

According to *Finance and Commerce* of Shanghai these proposed allocations suggest that the earnings last year were fully equal to those of 1937. Thus the dividend of 12 per cent is unchanged. The amount to be written off properties is the same as in the previous year, but \$5,000 extra is being allowed for contingencies (£25,000 in 1937) and the carry forward at £177,770 is increased (£173,327 in 1937).

5.—Bank of East Asia.

The Bank realized a profit of \$786,503.12 which is regarded as very satisfactory in the difficult circumstances. The following are the allocations:

Dividend of \$6.00 per share	.. .. .	\$335,916.00
Transfer to reserves	.. .. .	50,000.00
Bonus to staff	.. .. .	16,655.11
Carry forward	.. .. .	383,932.01
		<u>\$786,503.12</u>

6.—Joint Savings Society.

According to the balance sheet of the Society issued in March, a net profit for the six months ended December 1, 1938, of \$446,664.

Consolidated profit and loss account for the half year ended December 1, 1938, is as follows:—

Dr.	Dollars	Cr.	Dollars
To Management and General Expenses ..	215,051.23	By Interest, etc. ..	741,256.26
" Depreciation on Premises and Furniture ..	58,401.47		
" Organization Expenses written off ..	1,322.92		
" Income Tax ..	20,416.34		
Net Profit for the Period	446,064.30		
	<u>741,256.26</u>		<u>741,256.26</u>
	* * *		

Below is summarized conditions of leading industrial, public utilities and business companies in Shanghai.

1.—Ewo Cotton Mills, Ltd.

The extent of the profits of the mills in 1938 may be realized by the following table:

1933	\$676,601	1936	\$1,021,253
1934	472,273	1937	2,716,917
1935	284,320	1938	6,180,613

Note this record in the profits in 1938, despite the hostilities. *Finance and Commerce* comments upon the company's business results with the remark: "Such results help to prove how entirely misleading may be the general impression created by the statement that Shanghai's trade is either dead or dying as the result of the war."

2.—G. E. Marden and Co., Ltd.

At the 10th meeting of shareholders of the company the chairman, Mr. G. E. Marden, reported that the net profit for the year amounted to \$453,588.82, the largest in the history of the Company.

The amount standing at credit of profit and loss account, viz. \$391,696.23 was appropriated as follows:

Final Dividend of \$3 per share	\$225,000.00
Transfer to General Reserve	84,790.21
Carry Forward	81,306.02
	<u>291,096.23</u>

3.—Dominion Rubber Co.

The Company reported a profit for the year, after providing for the expenditure on replanting, of £23,453.63.

Then a dividend of 15 cents per share was made.

4.—Repah Rubber and Tapioca Estates.

At the 26th annual general meeting of shareholders of the company which was held on March 24, in Shanghai, it was announced that after charging directors' fees and estates managers' commission and crediting sundry income the profit for the year was \$12,807.26 which, added to the credit balance of \$24,594.00 brought forward, makes a total sum of \$37,401.26.

5.—Consolidated Rubber Estates, Ltd.

The profit of the company for the year ended December 31, 1938, amounted to \$49,327.90 which, added to the sum of \$13,862.28 brought forward from previous year, makes a total of \$63,190.18 at credit of profit and loss account.

6.—Shanghai Waterworks Co., Ltd.

Owing to the fact that Shanghai's consumption was biggest in history the company declared a dividend of 3s. per "A" class shares and one shilling eight pence for "B" class shares.

The net profit for the year was \$1,778,315.42 as compared with the net profit for 1937 of \$1,347,779.81.

The chairman said that practically without exception every item whether revenue or expenditure showed an increase as compared with the previous year. Just as in 1937 the position was dominated by the outbreak of the Sino-Japanese hostilities, the chairman said, so in 1938 the one important factor had been the depreciation of the Chinese dollar. So far as expenditure is concerned nearly every item had been adversely affected either directly or indirectly. Of the items affected indirectly fuel and power are the most important, fuel, both coal and oil, showing average increases of 60 to 70 per cent over 1937 costs and power 26 per

cent, these figures had since risen to 83 per cent and 46 per cent respectively.

Further, he said, the last half of the year was affected by an upward adjustment of salaries to meet the sharp rise in the cost of living. This adjustment has been made in common with most other undertakings in Shanghai.

As against these increases in expenditure the revenue from water sold shows a very satisfactory increase.

7.—The Shanghai Electric Construction Co.

The company declared a dividend of eight per cent for the year 1938.

8.—Shanghai Waterworks Fittings Co., Ltd.

At the annual meeting of the company a net profit of \$78,000 against a loss of \$34,900 for 1937 was reported. According to the chairman conditions affecting the business of the company improved during the year more rapidly than was expected. As regards the future he was of the opinion that present indications were that business was being maintained.

* * *

The real estate business in Shanghai during the year under review is worthy of note. Here are the reports of the representative companies.

1.—French Real Estate Co.

According to the report of the board of directors of the company the year has been satisfactory. After distributing a final dividend of \$10 per share, making a total of \$15 per share for the year 1938, the financial position of the company as at January, 1938, is as follows:—

Capital: 20,000 shares, Tls. 100 each, Tls. 2,000,000 @ 71.5 ..	\$2,797,202.80
Debentures: 19,840 of Tls. 100 each	2,774,825.18
17,300 of \$100 each	1,730,000.00
	<u>\$4,504,825.18</u>
Legal Reserve	\$ 187,192.46
Reserve for Depreciation and Contingencies	1,100,000.00
Reserve for Expense of future Debenture Issues	100,000.00
Special Repairs Reserve	100,000.00
Reserve for Loss of Rentals during reconstruction	175,000.00
Balance brought forward	121,197.38

2.—Shanghai Land Investment Co.

Finance and Commerce says that the results of the company's working for the past year would appear to provide some proof that conditions are steadily, although slowly, improving even for those undertakings which have large investments in the areas north of the Soochow Creek.

The profit for 1938 was \$142,085.36 which compares with a loss of \$308,601.74 in 1937. All the profits came in the second half of the year.

The above branches of industry all realized profits in 1938, indicating hostilities failed adversely to affect their business.

The Customs' review of China trade for 1938, published by Mr. J. M. H. Osborne, the Statistical Secretary of the Customs is of interest. The following is the returns of the trade with China done by the British and Japanese Empires, U.S.A. and her dependencies, Germany, and France and the Netherlands with their Colonies:—

1938

(In Chinese \$1,000; 000 omitted)

	Imports from C.\$	Exports to C.\$	Total C.\$
(1) British Empire	170,596	354,785	525,381
(2) Japanese Empire	255,128	165,103	420,231
(3) U.S.A. and Dependencies	154,804	94,830	249,634
(4) Germany	112,939	56,440	169,379
(5) France and Colonies	45,744	49,406	95,150
(6) Netherlands and Colonies	50,389	15,028	65,417

1937

(1) British Empire	201,993	298,711	500,704
(2) U.S.A. and Dependencies	192,757	239,770	432,527
(3) Japanese Empire	165,908	109,466	275,374
(4) Germany	146,373	72,477	218,850
(5) France and Colonies	45,182	58,504	103,686
(6) Netherlands and Colonies	86,848	20,579	107,427

(Continued on page 140)

Japanese Investments in Manchuria

By T. TATSUKI in Contemporary Manchuria

ACCORDING to surveys made by the South Manchuria Railway Company, Japanese investments in Manchuria previous to the Manchurian Incident are given as follows:

JAPANESE INVESTMENTS UP TO 1930

Investments	Total Amount	Percentage of Total Investments
Railways	Y425,216,000	26.3%
(Loans)	(140,921,000)	
Ports and Harbors	83,201,000	5.2%
Transportation	28,036,000	1.7%
Agriculture, Forestry and Mining	258,990,000	16.0%
(Loans)	(63,365,000)	
Industries	110,121,000	6.8%
Commerce	117,753,000	7.3%
Electric and Gas	37,283,000	2.3%
(Loans)	(1,155,000)	
Banking	106,705,000	6.6%
Financing and Trust	97,634,000	6.0%
Public Utilities	302,569,000	18.7%
Others	49,459,000	3.1%
(Loans)	(7,964,000)	
Total	1,616,966,000	100.0%
Direct Investments	1,403,561,000	86.9%
Investments through Loans	213,405,000	13.1%

As the above figures indicate, no less than Y1,616,966,000 had been invested by the Japanese in Manchuria prior to 1930 of which direct investments comprised 87 per cent and investment through loans 13 per cent. The largest single investment was made in the transportation industry which was about one-third of total investments, followed by public utilities, agriculture, forestry, and mining. This situation is due primarily to the great rôle which the S.M.R. has played as the nucleus of Japanese economic development of Manchuria. In spite of the great political changes which were brought about with the outbreak of the Manchurian Incident, the rôle of the S.M.R. as the motive power for all economic activities has remained intact, more than proving the indispensability of the services of this Company.

In looking over the finance reports of the S.M.R. for 1930, the total capital outlay of the company amounted to Y742,060,000 in that year, which was 47.8 per cent of total investments in Manchuria (or Y1,617,000,000). Directing our attention to the course of investments through bonds, we find that those issued in connection with the direct enterprises of the S.M.R. amounted to

Y711,000,000 and those issued for subsidiary concerns to Y127,000,000 the former constituting 85 per cent of total debentures.

As mentioned already, bond investments totalled Y838,000,000 and loan investments Y213,000,000 or Y1,051,000,000 in all. This total sum was short of the total Japanese investments in Manchuria or Y1,617,000,000 by Y566,000,000. This fact indicates that enterprises are expanding through capital accumulated in Manchuria, even though the interest and dividends paid annually to investors in Japan reach an enormous sum.

It is a fact of common knowledge that before the Incident, Manchuria was an arena for international and Chinese investment. Local investment had been made in the form of usury by local financiers, war-lords and corrupt officials, but among the foreign investments Japanese capital centring in the S.M.R. headed the list. According to statistics released by the S.M.R., foreign investments other than Japanese amounted to the following in 1928.

FOREIGN INVESTMENTS IN MANCHURIA ACCORDING TO COUNTRIES (1928)

Country	Investments	Percentage
Russia	Y465,015,000	82.5
Great Britain	39,590,000	7.0
United States	26,400,000	6.5
France	21,086,000	3.8
Sweden	850,000	—
Denmark	157,000	—
Total	553,098,000	100.0

Centring upon the North Manchuria Railway Russia's investments were far ahead of other countries constituting 82.5 per cent of the whole. In comparing the total foreign investments of Y553,000,000 in 1928 with the Y1,617,000,000 total Japanese investments at the end of 1930, one can easily see the predominant position that the Japanese held in Manchurian economic development even before the Manchurian Incident broke out.

After the Manchurian Incident

With the restoration of peaceful conditions following the Manchurian Incident, the economic relationship between Japan and Manchoukuo showed strong intimacy due chiefly to the establishment of the Japan-Manchoukuo economic bloc. Material supplied by surveys conducted by the S.M.R. show this phenomenal development in concrete figures and facts.

JAPANESE INVESTMENTS AFTER THE MANCHURIAN INCIDENT

(In 1,000 yen)

Investments	1932	1933	1934	1935	1936	1937	Total
S.M.R. Co.	55,510	60,925	173,175	247,765	132,430	170,325	840,130
S.M.R. Paid-up Capital	25,000	100,052	36,000	36,000	36,000	56,000	289,052
S.M.R. New Debentures	63,775	(-) 31,977	129,775	144,775	154,775	20,775	481,898
Borrowed by the S.M.R.	(-) 33,265	(-) 7,150	7,400	66,650	(-) 75,550	93,550	51,635
Released shares held by the S.M.R.	—	—	—	340	17,205	—	17,545
Related to the S.M.R.	—	8,700	38,450	38,875	31,350	19,650	137,025
Debentures of the Dairen Kisen Kaisha	—	5,000	8,000	—	—	—	13,000
Debentures of the former South Manchuria Electric Co.	—	—	10,000	—	—	—	10,000
Debentures of the International Express Co.	—	1,700	—	—	—	—	1,700
Debentures of the Manchuria Telegraph and Telephone Co.	—	—	8,000	7,000	—	8,000	23,000
Debentures of the South Manchuria Mining Co.	—	—	450	—	—	—	450
Debentures of the Manchuria Coal Mining Co.	—	—	—	10,000	—	—	10,000
Debentures of the Manchuria Electric Co.	—	—	—	10,000	15,000	—	25,000
Debentures of the Showa Steel Works	—	—	—	10,000	18,000	—	28,000
Debentures of the Chinchou-Pitzuwo Railway Co.	—	2,000	—	—	(-) 400	(-) 400	1,200
Borrowed by the Manchuria Chemical Industry Co.	—	—	12,000	—	(-) 6,250	4,050	9,800
Borrowed by the Manchuria Coal Mining Co.	—	—	—	—	5,000	13,000	13,000
Others	—	—	—	1,875	—	(-) 5,000	1,875
Manchoukuo	20,000	30,000	10,000	71,400	38,600	75,360	245,360
Manchoukuo Loans	20,000	—	—	(-) 2,000	(-) 2,000	(-) 2,000	14,000
Manchoukuo's National Foundation Bonds	—	30,000	—	(-) 2,000	(-) 4,000	(-) 6,000	18,000
Manchoukuo's Bonds for the North Manchuria Railway	—	—	—	60,000	60,000	—	120,000
Borrowed for the North Manchuria Railway	—	—	—	15,400	(-) 15,400	38,360	38,360
Manchoukuo's Bonds for Special Industries	—	—	10,000	—	—	—	10,000
Industrial Bank's Bonds	—	—	—	—	—	45,000	45,000
Others	12,203	38,345	65,225	21,983	59,440	84,863	282,059
Paid-up Capital of New Companies	12,203	38,345	65,225	21,963	36,046	34,144	207,946
Paid-up Capital of Existing Companies	—	—	—	—	23,394	50,719	74,113
Total	87,713	137,970	286,850	380,023	261,820	350,198	1,504,574

The investments made through bonds and loans between the years 1932 and 1937 aggregated Y1,504,574,000. In view of the fact that investment activities of the Japanese in North China had shown a stagnant tendency, it can be safely concluded that Japanese overseas investments were concentrated wholly on Manchuria. The channel of inflowing Japanese capital into this country remained the same even after the Manchurian Incident, namely through the S.M.R. investments within the Company for the 1932-1936 period amounted to Y670,000,000 or 58 per cent of the total, but adding the investments in related and subsidiary enterprises to this figure, the total becomes 68 per cent. The same figures for 1937, however, declined somewhat, the S.M.R. investments constituting only 48.64 per cent, and 54.25 per cent of total investments even if quasi-S.M.R. investments constituting 5.61 per cent were included.*

From a general standpoint this descent of the activities of the S.M.R. and the corresponding ascent of Manchoukuo indicate the fact that the new State has strengthened its economic independence, but viewing the same situation in a more concrete manner, this downward and upward movement respectively is due primarily to the launching of the Five-Year Industrial Development Plan by Manchoukuo in 1937. In inducing the necessary capital from Japan, the S.M.R. has resorted to the floatation of debentures, paid-up shares, and loans, while Manchoukuo has relied upon the floatation of bonds in Japanese currency, issuance of bonds by the Industrial Bank of Manchu, activities of the Central Bank of Manchu, loans contracted with the Bank of Japan, and upon the shares and debentures of the Manchuria Heavy Industry Development Company.

Attention is now directed to the various fields in which capital has been invested since the Manchurian Incident. The following table gives a general survey of the situation.

JAPANESE INVESTMENTS IN MANCHURIA SINCE 1932
(In 1,000 yen)

Investment	1932	1933	1934	1935	1936
Mining	—	2,500	21,662	20,412	1,225
Industry	2,580	65,713	147,270	64,478	159,769
Agriculture and Forestry	25	62	580	37	2,687
Aquatic Products Industry	—	12	620	740	—
Transportation	85,200	298,398	179,145	88,270	259,952
Communication	—	29,375	8,000	7,000	6,875
Colonization	—	—	—	—	16,500
Land and Buildings	3,000	375	3,037	8,540	2,950
Commerce	1,410	1,685	3,170	11,307	11,764
Trade	250	1,200	125	—	125
Financing	15,025	7,020	7,924	1,025	4,302
Others	239	100	287	597	3,069

S.M.R. statistics.

In 1932 and 1933 investments in the transportation and communication fields held a preponderant position, revealing the fact that these fields were regarded as the foundation of Manchoukuo's economic development and the fundamental basis of the Japan-Manchoukuo economic bloc. Construction of main railway arteries, expansion of the highway and communication network and the organization and strengthening of the financial structure were the most urgent needs at the time. To meet these needs, the Central Bank of Manchu was founded in 1932, the Manchuria Telegraph and Telephone Company was created in 1933, and numerous railways were built by the S.M.R. at a terrific speed. Much energy was seen in the mining and industrial fields during 1934 and 1935, the paid-up capital in these industries measuring up very close to the capital invested by the S.M.R. in the construction of new lines.

In a word, the outstanding characteristic of investments in Manchuria during the initial construction stage, was no doubt the completion of railways with the S.M.R. acting as the pivot, but an unprecedented spurt was registered in this period by the fundamental industries such as metallic, chemical and electric enterprises. Although no figures for 1937 are yet available this tendency continued into that year.

Moreover the total Y1,500,000,000 investments listed in the above table do not include other investments, primarily private in nature, such as the opening of branch offices in Manchuria by Japanese companies, partnerships, private stores, factories and real estate business firms. These private enterprises have invested considerable sums in their respective lines of business. There is no way of ascertaining the exact amount of these private investments, but the international accounts of Manchoukuo have reached MY78,000,000 for the 1933-1937 period. Assuming that these private investments were also made in the year 1932, we can safely set the total for this item at MY80,000,000.

In a broad sense, the expenditures of the Japanese Government for Manchurian affairs which have been met with funds from the national treasury, must also be taken into account. These expenditures are listed in the following table.

EXPENDITURES INVOLVED IN THE MANCHURIAN INCIDENT

1931	Y 53,569,000
1932	278,444,000
1933	196,603,000
1934	158,149,000
1935	183,009,000
1936	200,201,000
1937	285,409,000 (Budget)

Total Y1,355,384,000

Thus, the grand total of all Japanese investments in Manchuria since the Manchurian Incident must include the Y1,504,574,000 invested through bonds and loans, private investments totalling Y80,000,000 and the expenditures for Manchurian affairs Y1,355,384,000 (of this sum about Y600,000,000 flowed into Manchuria actually), all of which bring the total up to the enormous sum of Y2,185,000,000, but the story does not end here. Adding further the Y1,617,000,000 invested prior to the Manchurian Incident, the appalling sum of Y3,800,000,000 is what the Japanese have spent in bringing about the economic development of Manchuria.

Returns on Japanese Investments

According to our calculation, the Japanese have invested Y2,185,000,000 in Manchuria since the great incident, but it will be very interesting to find out just how much of this large sum of money got back to Japan in the form of profits or returns. Needless to say, the reversed flow of currency into Japan from Manchuria can be classified into visible and invisible items, receipts from the exportation of capital goods forming the greater part of the former while the latter is composed mainly of interest and dividends on loans and bonds. Visible items will be discussed here first. Figures compiled by the S.M.R. indicate the extent to which payments have been made to Japan.

PAYMENTS MADE BY MANCHOUKUO TO JAPAN SINCE THE MANCHURIAN INCIDENT
(In 1,000 yen)

Year	Payments to Japan for Import Balance	Interest and Dividends	Amount Sent Home by Japanese	Maritime Freight Rates, Insurance, Savings, etc.	Total
1932	47,146	38,000	13,500	23,800	122,446
1933	130,167	60,584	14,746	17,803	223,300
1934	189,927	59,712	17,210	28,258	295,107
1935	239,383	83,805	17,988	32,426	373,602
1936	258,609	97,184	18,000	30,000	403,793
Total	770,940	339,285	81,449	132,287	1,418,248

Subtracting the Y1,418,000,000 that "went back home" from the Y2,100,000,000 total investments in Manchuria by the year 1936, Y682,000,000 remains in Manchuria. From this computation it can be seen that Japanese investments in Manchuria are paying back fast. Such huge returns are apt to entice further investments in Manchuria, giving a very bright outlook on the future of Japanese investments in this country.

Narrowing down our analysis to pure economics, it must be admitted that the dividends and interest paid on capital, debentures, loans, etc., generally determine the attitude of prospective investors. They more or less act as the weather guide for investment activities. In the table below is shown the tendency of interest and dividend payments to Japan made during the year 1937 as indicated in the international payments accounts of Manchoukuo.

INVISIBLE PAYMENTS TO JAPAN
(In 1,000 yen)

	1936	1937
(1) Interest and Dividend Payments on Manchoukuo's Bonds	Y86,194	Y98,585
Interest on National Loans of Manchoukuo	5,470	8,545
Interest on Local Government Loans and Bonds	33,982	37,305
Dividends on Shares of Companies in Manchoukuo	46,724	52,735
(2) Interest on Deposits and Loans of Outside Interests	8,486	12,577
(3) Profits enjoyed within Manchuria by Companies Outside of Manchoukuo	8,629	10,199
Total	189,485	219,946

* Manchoukuo's investments amounted to 14.73 per cent during the 1932-1936 period but increased to 21.52 per cent in 1937.

In 1937 total invisible returns to Japan amounted to Y219,000,000, an increase of about Y30,000,000 over the Y189,000,000 for 1936. The following table is very instrumental in showing the percentage of invisible returns on investments in 1937.

PERCENTAGE OF INVISIBLE RETURNS

	Amount of Investment	Interest Returns	Percentage
National Loans	Y193,000,000	Y 8,545,000	4.43%
Bonds, Local Government Loans	908,550,000	37,305,000	4.10%
Shares	1,078,995,000	52,735,000	4.88%
Total	2,180,545,000	98,585,000	4.52%
Loans Contracted	134,545,000	12,577,000	

The time element must be taken into account in our study since the interest and dividends for 1936 might have been sent back to Japan the following year or in 1937, but in general the percentage of returns has followed a regular course. A return of 4.52 per cent may be a little too small to arouse the interest of enterprising investors in colonial countries, but 1938 figures indicate that in Japan government bonds yielded 3.886 per cent (January, 1938), national loans 4.384 per cent, and shares 5.40 per cent which are not very different from Manchurian returns. Bearing in mind the returns in the form of dividends and interest which do not go back to Japan, the situation here is not bad at all.

Japan's Investing Power

As noted in the foregoing pages, Japanese investments in the form of bonds and loans since the Manchurian Incident have reached the stupendous sum of over Y1,500,000,000 and have shown a smooth tendency on the whole, but reference must be made here to the underlying economic foundation of Japan which enabled investments of prodigious proportions in Manchuria. This problem is very essential in forecasting the future of Japanese investments.

In a word such tremendous investments in Manchuria were made possible by the increase of idle capital in Japan as a result of the economic depression that set in in 1929.

Statistics compiled by the Tokyo Clearing House give the amount of idle capital in Japan during the years between 1931 and 1935.

JAPAN'S INVESTING POWER

(In 1,000,000 yen)

Year	Banks	Trust Companies	Insurance Companies	Postal Insurance	In-Postal Savings	Total
1931	151	335	1,144	255	1,967	3,852
1932	1,060	343	1,203	323	2,113	5,043
1933	2,292	459	1,395	463	2,350	6,959
1934	3,240	676	1,631	585	2,563	8,695
1935	3,853	772	1,631	585	2,698	9,539

It should be noted that the above figures indicate the capital available for making loans by the various institutions. Surplus of deposits of banks, funds of trust companies, surplus postal and transfer savings of the Government Deposit Office (Ministry of Communications), reserve and surplus funds of insurance companies, and reserve funds of postal insurance were taken into account in making the above tabulation.

It was this idle capital that was used to cover public loans to the extent of about Y1,000,000,000 annually from 1931 up to the outbreak of the China Incident, and on the other hand for investments in Manchuria. The following table shows the fields in which idle capital were invested up to the China Incident.

BONDS AND LOANS ISSUED IN JAPAN UP TO THE CHINA INCIDENT

(In 1,000,000 yen)

Year	National Loans, Local Loans	(a) Debentures, Shares	(b) Advanced by Financial Institutions	A+B	Total
1931	370	339	114	453	824
1932	948	316	(-) 463	(-) 147	801
1933	2,344	290	(-) 249	41	1,385
1934	1,276	699	(-) 193	506	1,782
1935	959	626	267	893	1,852
1936	1,024	794	457	1,251	2,275

The above table shows that circulating capital (A+B) increased tremendously in 1934. This is especially so with debentures and shares which registered a sudden spurt in 1934, although they had been marking time more or less during the previous year. Since this manifestation of pent-up strength (or since 1934), between

Y600,000,000 and Y700,000,000 have been invested annually. How much out of this figure was invested in Manchuria?

It is necessary to find out the importance which Manchuria bound capital had exercised in the Japanese financial market. The table below compiled by the S.M.R. is very useful in clarifying this situation.

POSITION OF MANCHURIAN INVESTMENTS IN THE JAPANESE FINANCIAL MARKET

(In 1,000,000 yen)

	1933	1934	1935	1936	Total
Total New Floatation	621	634	613	662	2,539
New Debentures of Japanese Companies ..	230	420	411	368	1,447
Manchurian Debentures	50	158	230	244	682
Total Paid-up Capital	448	578	448	738	2,212
Manchurian Paid-up Capital	99	101	58	113	371
Manchurian Paid-up Capital, S.M.R. Excluded	38	65	22	77	202

The increase in the investment in industries since 1933 is due primarily to the development of investments in Manchuria. Investments in Manchuria in the form of debentures comprise 27 per cent of the total new bond floatation and 47 per cent of new debentures of Japanese companies, while the payment for Manchurian shares amount to 17 per cent of the total paid-up capital in Japan. The total Manchurian debentures and shares paid-up during the four years since 1933 amount to Y1,000,000,000 (or an yearly average of Y250,000,000) which is approximately 22 per cent of all new floatation and paid-up shares of Japan combined for the same period. Due to the economic depression and the increase in deposits, investors in Japan who had hesitated because of the control over Manchurian industries dared to invest such huge sums in Manchuria.

With the outbreak of the China Incident in July, 1937, and subsequently with the China Incident expenditures of the Government acting as the axis, a marked transformation was witnessed in the Japanese financial market. Needless to say Government expenditures depend upon the issuance of public loans and have naturally created an increase of such loans, but on the other hand shares and debentures have recorded a considerable gain as a result of a demand for capital necessary for the expansion of production. These tendencies resulted in the tremendous increase of securities.

INCREASE OF JAPANESE BONDS SINCE THE CHINA INCIDENT

(Unit—1,000,000 yen)

	Increase for 1 year up to July 31, 1937	Increase for 1 year up to July 31, 1938
Local Government Bonds	76.6	35.8
Debentures (including bank issues) ..	123.2	616.6
Shares (paid-up)	1,485.5	1,877.0
Total	1,685.3	2,519.4
National Loans	712.5	3,466.8
Grand Total	2,397.8	5,986.2

Statistics from Bank of Japan.

Attention will now be directed to the ability of the Japanese financial circles such as banks throughout Japan (Bank of Japan excluded), all trust companies, and the Postal Savings to absorb these increasing securities, considering deposits, advances and retention of securities of these institutions.

DEPOSITS, ADVANCES AND SECURITIES OF ALL FINANCIAL INSTITUTIONS OF JAPAN

(In 1,000,000 yen)

	On July 31, 1936	On July 31, 1937	On July 31, 1938	1 year's increase up to July 31, 1937	1 year's increase up to July 31, 1938
Deposits	18,669.6	20,269.2	23,340.0	1,599.6	3,070.8
Advances	10,601.0	11,990.7	13,234.8	1,389.7	1,244.1
Securities	11,962.8	12,211.9	14,605.6	249.1	2,393.7
National Loans	6,160.6	6,380.1	8,496.8	219.5	2,267.7
Local Loans	1,698.0	1,705.2	1,711.6	7.2	6.4
Debentures	2,967.2	2,888.3	3,015.3	78.9	127.0
Shares	704.8	790.1	895.0	85.3	104.4
Others	432.1	448.1	486.9	16.0	38.8

During the years ending in July, 1938, deposits showed an increase of Y3,070,000,000 of which it is surmized, Y2,120,000,000 absorbed national loans, advances and securities.

(Continued on page 140)

War and the Steel Industry

(The Oriental Economist)

JAPAN's steel industry has suffered from an unbalanced demand-supply position since the period of semi-war time conditions which preceded the outbreak of the China Incident. Even then there was a sharp increase in demand from the munition industries which caused a steady rise of consumption and made an expansion of the production inevitable. Consequently the five-year iron and steel production increase plan embracing both Japan and Manchoukuo was announced in March, 1937, and the objective fixed was the production of 6,200,000 metric tons of steel materials for 1941. However, this aim was extended to 10,000,000 metric tons after the China Incident began, in anticipation of a still larger consumption, and under the leadership of the Nippon Iron Manufacturing Company, all of the iron and steel firms have since been bending their efforts to augmenting production in accordance with the revised plan. The following is a summary of Japan's iron and steel production increase program as enlarged following the outbreak of the China Incident:

IRON AND STEEL PRODUCTION EXPANSION PROGRAM
(Excluding Manchoukuo; In 1,000 metric tons)

	Capacity, end of 1936	Plans approved	Projected	Total
Pig Iron:				
Japan Iron ..	2,150	2,600	1,300	6,050
Other companies ..	270	720	700	1,700
Total ..	2,420	3,320	2,000	7,750
STEEL INGOT:				
Japan Iron ..	3,100	1,300	1,100	5,500
Other companies ..	2,060	730	900	3,700
Total ..	5,160	2,030	2,000	9,200
STEEL PRODUCTS:				
Japan Iron ..	2,220	1,300	1,030	4,550
Other companies ..	2,790	410	570	3,770
Total ..	5,010	1,110	1,600	8,320

When the above plan is accomplished, Japan proper will have a capacity for producing 7,750,000 metric tons of pig iron, 9,200,000 metric tons of steel ingots and 8,320,000 metric tons of steel materials. It is essential, of course, to assure adequate supplies of iron ore and coking coal for the materialization of this plan, but it is believed that these raw materials can be acquired in sufficient volume by developing the resources in Manchoukuo and China. At present, however, the rate of pig iron output is somewhat lower than before, because, owing to the hostilities, the importation of iron ore from the Yangtze region has stopped and the supply of coal for coke has become inadequate. Blast furnaces are being completed one after another, but they are not operating to capacity. Meantime the importation of scrap iron has been restricted since the beginning of 1938 and this has tended to reveal a defect of the steel industry of this country, which employs the so-called scrap iron method involving the consumption of a large volume of scrap.

Under the circumstances, the supply of iron and steel became insufficient, and the shortage finally developed to the point where legal measures were invoked to restrict consumption and adjust the relative position of demand and supply. From May, 1938, the Government has imposed various regulations restricting the manufacture of cast iron and steel goods and the use of iron and steel for buildings and other structures; and it has also enforced strict economy in the private consumption of iron and steel for unnecessary and non-urgent purposes. At the same time steps have been taken to curtail the production of structural steel such as round bars, steel tubes, wire rods and sheets, in order to increase the supply of steel materials for the manufacture of arms and ammunition.

Eventually the only remaining means of coping with the increasing demand and limited supply was to fix consumption quotas, and this was adopted when the Commerce and Industry Ministry announced the iron and steel distribution control system. Early in 1938 the Ministry organized the Iron and Steel Control

Council, consisting of officials of the Government Departments concerned, and representatives of the iron manufacturers and the principal consumers. This Council determines in advance for each quarter of the year, the quantities of various kinds of iron and steel that are to be produced, imported, and distributed, and the amount of iron and steel manufactures for exportation. On a basis of the Council's decisions, the Nippon Steel Materials Federation, which is an iron and steel production and distribution combine, allocates production quotas for the joint sales associations in different branches of the industry, and the latter in turn fix the quotas for their affiliated iron and steel manufacturing companies. Similarly the consumers have organized their own distribution control bodies in different fields such as engineering and building, coal mining, the oil industry, the electric power industry, machinery manufacture and the like. Persons who are not affiliated with one of these organizations are not entitled to a supply of iron and steel. In the machinery industry, different manufacturers, associations have been organized according to kinds of products and localities, in view of the large number of consumers. These associations are consolidated into the Nippon Federation of Iron and Steel Goods Manufacturers Associations, which receives the consumption quota for the entire machinery industry.

The above distribution quota system has been in force since the second quarter of 1938. It was given a legal basis by virtue of the Iron and Steel Distribution Control Regulation which went into effect in July, 1938, and therefore persons who deal in iron and steel in violation of the system are liable to penalty. It should be noted that in the actual operation of this regulation, the distribution quotas are applied to pig iron and pressed and rolled steel materials but not to special steel, cast steel and wrought steel. Both the manufacturers and distributors are required to sell their goods only against distribution quota certificates, which are issued by the distribution control organizations in the various branches of the industry, within the limits of the respective quotas fixed by the Iron and Steel Control Council. The certificates are known as distribution coupons.

Supplementing this distribution quota system is a sales system which forms a perfect pyramid with the Nippon Steel Materials Federation at the top. The Federation is the control machinery for the steel combine in Japan. A steel combine was for the first time organized during the period of acute depression in 1929-1930, but its effectiveness was rather limited for several years. With the pronounced rise of the industries related to the manufacture of armaments and ammunition, the activities of those outside the Federation increased, and as the code of the cartel was imperfect and had no binding power, the restrictions on price and production were observed solely on a voluntary basis. Thus the cartel's power to effect control was weak. Eventually the steel manufacturers themselves recognized the necessity of setting up a semi-wartime iron and steel control system, and meanwhile the Commerce and Industry Ministry was attempting to effect control of the industry by strengthening the cartel. Negotiations were started at the beginning of 1937 for the formation of a powerful joint sales association covering the entire field of steel materials, and in the following September and October seven such associations were organized in the lines of semi-finished goods, namely, bars, shapes, plates, wire rods, stripes and tubes. These were followed by the organization in March 1938 of similar groups for sheets and tinplate, and later the Steel Ingot Association, an organ for the control of steel ingot production. Finally the Nippon Steel Materials Federation was reorganized, and under it were placed all the iron and steel manufacturers of Japan.

The sales system under the Federation is divided into three brackets. Formerly dealers had been prone to conduct speculative operations which tended to cause undue fluctuation of the prices, but under the new system they have been reduced to a status subordinate to the joint sales association in their respective branches, with the rates of their commission strictly fixed on a basis of the official quotations made by the associations, and with price advances restricted to certain limits. Under the joint sales association, sales

are carried on through appointed sales firms, appointed jobbers and special dealers, the last named being those who actually deal with the ultimate consumers. Both the appointed jobbers and the special dealers are organized into respective national commercial associations. By means of this solidly organized structure, the iron and steel trade in Japan is now being strictly controlled, with the jobbers and dealers reduced to the status of mere commission merchants.

At present the Steel Materials Joint Sales Associations only fixes the official quotations and decides on the production quotas, with a pool, accounting system applied to a limited number of products. This system is considered inadequate for the perfect operation of sales control and the prevention of outlaw selling, and so it has been decided to establish shortly steel materials joint distribution company that will buy and sell all the steel products. The proposed company is to deal in bars, shapes, wire rods and plates at first. It will be capitalized at Y30,000,000, with all makers and distributors as shareholders, and preparations for its formal organization were expected to be completed within 1938. There is little doubt but that the new company will enhance the efficiency of the country's steel materials distribution system.

There were formerly two organizations for the distribution of pig iron, namely, the Nippon Iron Manufacturing Company, which controlled the sale of its own products and European, American, and Bengal pig iron; and the Pig Iron Joint Sales Company, which with the Showa Iron Works in the background, dealt in Manchurian pig iron and Indian pig iron (products of the Burns and Tata Companies). The unification of these two systems was accelerated by the establishment of the one price system for pig iron, and finally in July 1938 the Japan-Manchoukuo Iron and Steel Sales Company, Limited, was formed with a capital of Y2,000,000 which is shared by the Nippon Iron Manufacturing Company and the Nichiman Trading Company. The Manchurian interests have equal representation. The company took over the sales business of the Nippon Iron Manufacturing Company and the Pig Iron Joint Sales Company, and is distributing pig iron exclusively, in which activity it plays a rôle similar to that of the Nippon Steel Materials Federation in the steel trade.

It has also been decided to set up a distribution control council for scrap and special steel, similar to that for pig iron and ordinary steels. The council will fix quotas for the consumers once each quarter after duly considering both the demand and supply. It was decided to enforce the quota system for scrap from December, 1938, and for special steel from January 1, 1939. The quota system has also been applied to semi-finished steel products such as polished hoops, cans, castings and five gallon drums.

It has been made clear that the distribution quota system now extends throughout the entire iron and steel trade of Japan, and this condition is expected to prevail for some time to come in view of the none too excellent progress of the production increase scheme. Important iron mines along the Yangtze River, including the Tayeh mine, have recently come under the control of the Imperial forces, but their operation and production will not reach important proportions for some time to come. All things considered, it is anticipated that a stringency of supply will continue to exist in the iron and steel trade of this country.

Japanese Investments in Manchuria

(Continued from page 138)

In contrast to the inactive state of short-term capital the demand for long-term capital is great since shares, debentures, etc. have increased tremendously in comparison to the amount of securities held by financial institutions. During the year ending in July, 1938, national loans increased to Y3,460,000,000 of which Y2,120,000,000 were holdings of the main banking institutions, Y430,000,000 of the Bank of Japan, and Y200,000,000 covered by the gold reserve special accounts. In essence they have been covered smoothly. Debentures of companies, however, increased by Y620,000,000 of which only Y130,000,000 were consumed by the principal financial institutions. Similarly capital paid-up increased to Y1,880,000,000, but these institutions took in less than Y100,000,000. The main cause of the over-abundance of shares

and the dullness of debentures in the stock market is the slack in the supply of long-term capital.

Since Japan's controlled economy is still on its way to intensification, investments will probably be directed to national loans, munitions industry, and export industries. Already the Provisional Capital Readjustment Law has been passed, and it is surmised that this legislation will have some effect on the investment situation in Manchuria. The capital required for carrying out the revised Five-Year Industrial Development Plan of Manchoukuo is estimated at Y5,000,000,000 of which sum Y2,300,000,000 will be raised in Japan. This scheme will create no small problem in Japanese financial circles. Nevertheless, Japanese capital is the fundamental requisite for the realization of Manchoukuo's new Five-Year Plan which aims at developing the supplying power of Manchoukuo and the expansion of Japanese and Manchoukuoan productive power, and since the outcome of this Plan holds the key to the movement of Japanese capital the Governments of both countries will no doubt stress the inflow of Japanese capital into Manchoukuo.

As related above, the export balance of Japan to Manchoukuo, money sent home by Japanese living in Manchoukuo, deposits of Manchurian companies in Japanese banks, payments of interest, dividends on shares, etc., will create a total return on investments, estimated at 70 per cent. In addition there is no possibility of capital in Manchuria escaping from this country to the outside due to the existence of the exchange control system. Bearing these facts in mind we can safely conclude that Japan's investments in Manchoukuo will be perfected and strengthened in conformity with national policy. Mr. Fukuoka, chairman of the Manchoukuo National Loan Syndicate, who visited Manchuria recently has voiced his opinion in the following words:

"We shall do everything in our power to carry out our policy. There is enough strength in the financial market of Japan."

Economic Recovery in Shanghai

(Continued from page 135)

The prosperity of industry in Shanghai may be also conjectured from another angle, i.e. the import of coal. The total amount of coal imported into Shanghai during 1938 was as follows:—

	(in metric ton)				
	Jan.-Sept.	October	Nov.	Dec.	Total
From Japan	8,766	—	54,362	71,301	134,429
Formosa	28,717	12,485	21,704	12,725	74,630
Kwantung Prov. ..	—	—	—	45	45
French Indo-China ..	283,112	16,902	81,700	53,281	434,995
Netherland India ..	9,501	63	—	5	9,561
India	81,355	68,028	104,250	25,611	279,244
Hongkong	183	—	—	116	299
Other countries ..	40,804	20,999	511	7,836	70,150
Total	452,438	117,476	262,527	170,920	1,003,361

The above brief survey of economics in Shanghai on the basis of statistics testifies to the vitality of Shanghai for it has achieved a brisk recovery in industry of all kinds. And there is no reason why this condition should not gain momentum after peace is restored. Greater opportunity for outside investment will be provided once order is established. Japan, instead of keeping China in a semi-colonial condition, intends to place her on an equal footing with any Western country economically as well as politically only on condition that she adhere to the new order of East Asia. The "New Order" is, as a matter of fact, a new political theory based on racialism and not an instrument for exploiting China by keeping her in a semi-colonial condition as the Western capitalistic powers have in the past.

Real business prosperity in China can only be expected in future when China collaborates with Japan for establishing permanent peace in the Far East, and when the Western countries relinquish their attitude of treating China as a colonial dependency. On the part of Japan she will not, and cannot close the door of China against third power nationals, as is attested by the fact that the industry in China during 1938 when the hostilities raged most fiercely showed such results as reviewed herein.

Maintenance of Depths Alongside Wharves and Piers by Dredging

By **HERBERT CHATLEY, D.Sc. (Eng.),**
*M.Inst.C.E., in The Dock and
Harbor Authority*

IN practically all harbors there is a certain amount of accretion under and alongside a wharf which, in course of time, reduces the available depth of water. In some places, such accretion is so large as to necessitate almost continuous curative treatment, and may even render the wharf useless or uneconomic.

In a river harbor where silting is prevalent and wharves are situated along the banks, the artificially created depths alongside are frequently greater than are consistent with the natural regime and there is a steady tendency to revert to the previous conditions. This may be aggravated by natural or artificial deepening of the main channel which tends to increase the midstream velocity and so, since the mean velocity remains practically the same, the longshore velocities are diminished and silting is accelerated. The hydraulic resistance of open piling also checks the marginal velocity. Material accumulates under the deck and gradually slips down into the berthing space. If the substructure of the wharf is closed there is a tendency for a slope to be built against the face of the wharf. In straight reaches there is a slight helical current, which runs obliquely on the surface of a river towards the center, descends there to the bed, travels obliquely outwards across the bed and ascends the sides. Since the latter motion is opposed to gravity, silt tends to be transferred from the center of the channel to the shores.

On concave shores the stability conditions are much better, but the greatest velocities occur some little distance from the shore, and by causing bottom scour may cause the surface and bank material to slip on to the berthing space, in spite of increased depths appearing further out. This condition, incidentally, may endanger the stability of the wharf as a whole.

On a convex bank the longshore velocities are low or may even be backward relative to the main stream. There is, more-



Dredger, working a 1 cu. yd. grab at 18-ft. radius in Japan

over, a special spiral current at bends which ascends the convex shore. From both causes, such convexes accrete more rapidly than other parts of a river bed.

In a marine basin or a cul-de-sac, silting is more or less uniform, depending simply on the degree to which the water is changed, which again is principally dependent on the rise and fall outside, i.e., the tide. Thus, if the mean tidal range is, say 7-ft. and the mean silt content is 100 parts of solids per million by volume, as there are about 700 tides per annum, the mean deposit will be $(7 \times 700) / 10,000 = \text{say, } \frac{1}{2}\text{-ft.}$ per annum of solid, which will bulk with contained water to a thickness of from 1-ft. to perhaps 3-ft., according to the fineness and irregularity of the particles.

Abruptly ended excavations in river convexes may silt up with very great rapidity, owing to bottom drift and the silt falling from the continuously passing stream above them.

General Principles of Riparian Dredging

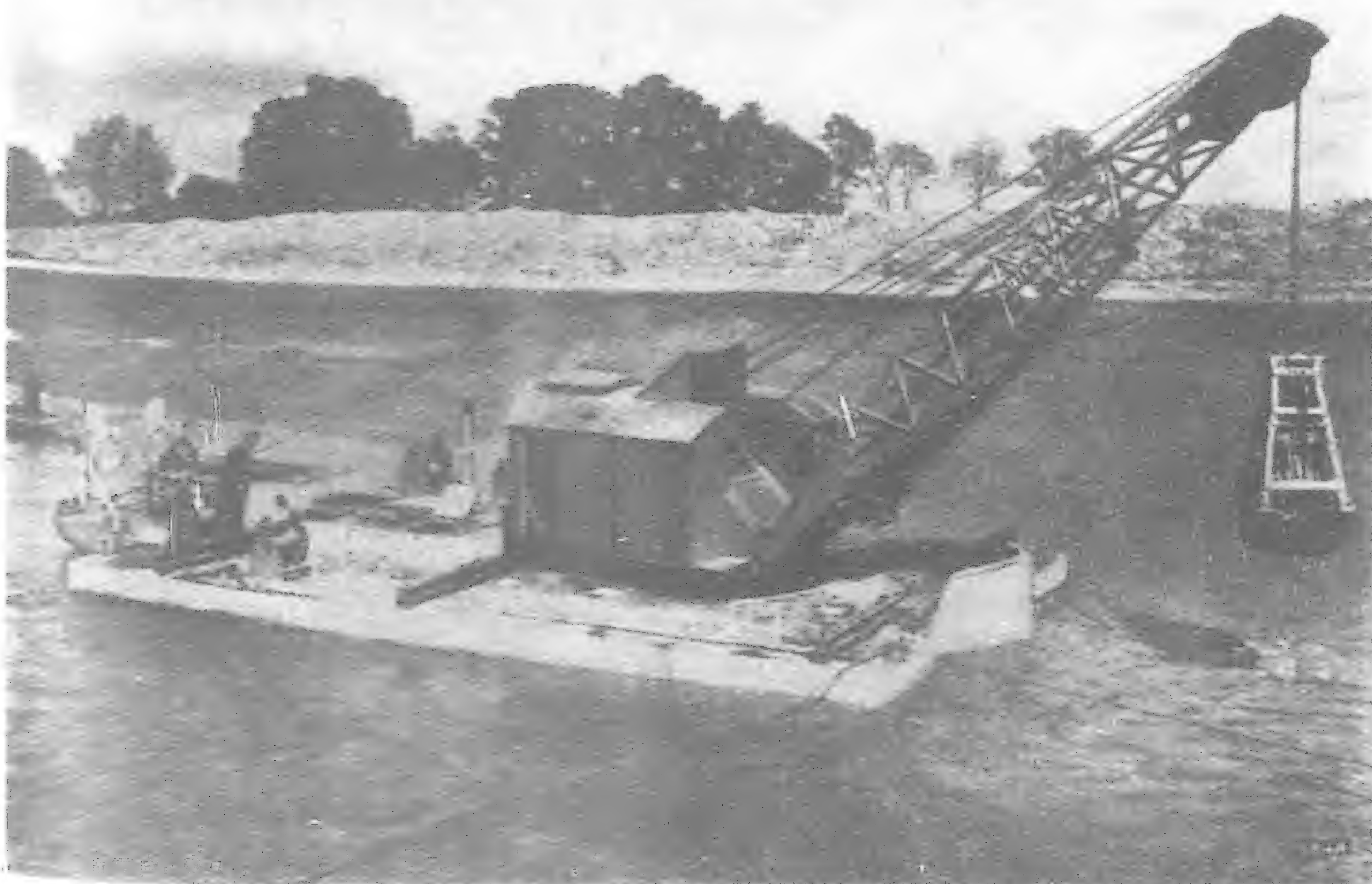
Having regard to these circumstances, the following conditions may be indicated in connection with dredging alongside banks or wharves:

- (1) The new depths should depart as little as possible from the known regime conditions.
- (2) The cut should extend outwards and endwards into equal or greater depths, so that such current as there may be can flow over it, or if a trench is made it should run out at its ends into water of equal or greater depth.
- (3) The cut should be made as quickly as possible and only present abrupt changes of depth for a very short time.
- (4) Large shallow cuts are more stable than short deep ones.
- (5) If the volume to be excavated to produce a horizontal or sloping shelf out to water already of the desired depth is very large, it is expedient to cut a through trench parallel to and near the shore extending to the deep water at its ends and subsequently to widen it, rather than to attempt cutting the whole width at one time.

Types of Dredger

In the excavation of bed material alongside a wharf, a dredger needs to fulfil most, if not all, of the following requirements:—

- (a) Rapid working, so as to minimize re-accretion and reduce the time in which berths are out of use.



A grab dredger and jib in two sections for working at a radii of 25-ft. and 50-ft.



Riparian dredging with dipper dredge

- (b) Minimum mooring space, to avoid interference with traffic and use of adjacent berths.
- (c) Easy removal to and from site.
- (d) Ability to work close up to vertical face.
- (e) Accurate depth and position control, so as to avoid over-dredging and irregular cutting.
- (f) Level cutting of the bottom.
- (g) Simple expeditious arrangements for removing spoil.

Some of these conditions conflict with one another and compel a certain amount of compromise. Thus rapid working implies a large dredger, whereas the reduction of interference with shipping favors a small one. Level cutting and accurate depth and bottom control favor the ladder-bucket type, but this type is not satisfactory unless it is fairly large and can only work up against a vertical face if it has a side ladder or is set square to the wharf face. It is also more likely to injure the wharf if used close up. Spuds are preferable to anchor moorings, but are more expensive to install. Dipper dredgers are less economical than grabs, except in heavy firm material, and the hulls are larger. They also cannot cut to the full depth quite close up to the face of the wharf. Suction types are rarely satisfactory for wharf dredging, unless the material is coarse, loose sand, which is rarely the case with re-accretion. Working in clays, a rotary cutter is necessary, and this cannot be brought close to the wharf face, and the spoil contains a large amount of water which cannot be easily separated from the spoil. Unless great care is taken, the suction dredger of the moored type makes an uneven cut. Unless traffic conditions will allow of a pipe-line to an adjacent shore basin or dumping pool, the suction type of dredger is usually out of the question.

Except in hard bottoms, the usual practice is to employ grab dredgers with attendant barges. The cycle of operations (cut, lift, swing, drop in barge and swing back) occupies usually less than one minute, so that the full dredging rate is about, say, 70 times the mean effective bucket load per hour.* The mean dredging rate is reduced from this by the time required to change barges, waiting for empty barges, breakdowns, interference by ship traffic and shifting the dredger moorings, so that in the long run it is rarely possible to achieve much more than 50 bucket loads per hour.

Size of Dredger

In those cases where accretion is small, it may prove economical for a wharf owner with a moderately long frontage to keep a small grab

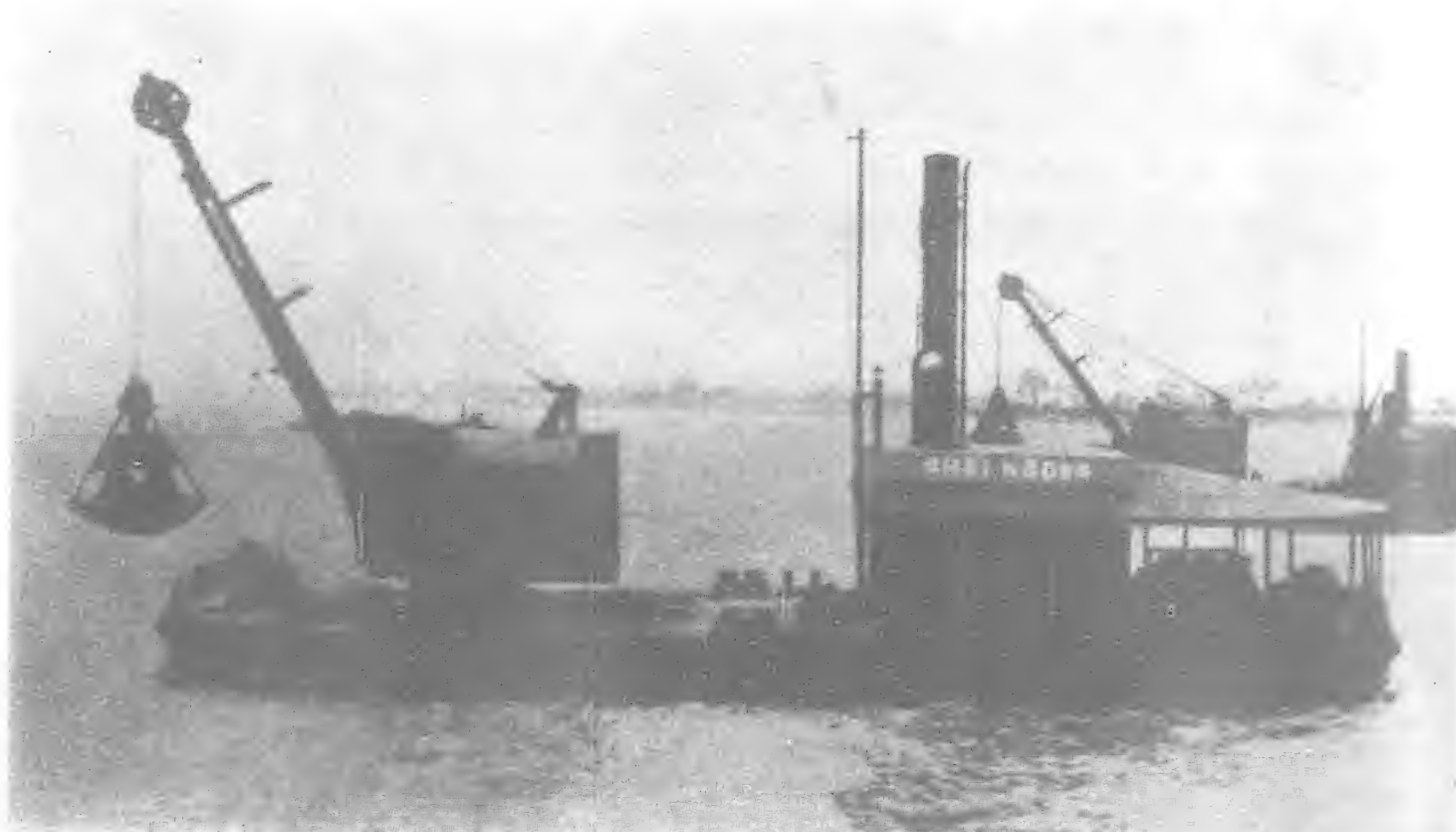
dredger (say, $\frac{1}{2}$ -yard bucket) working continuously, but for steady work small grab dredgers are less efficient than large ones; the delays in changing barges and shifting the dredger are nearly as great as those with larger vessels and reduce the mean output to a very small figure. The smaller weight and closing power of the small buckets causes them to make much less satisfactory cuts and the work is more likely to be hampered by stones and other obstructions. On the other hand, very large grab dredgers are objectionable on account of the space occupied by the hull and moorings and the great weight of the individual bucket load, which compels the use of very strong barges.

In general, it is found that a $1\frac{1}{2}$ cu. yd. bucket capacity is convenient, allowing a mean output (including normal delays) of, say, 75 cu. yds. per hour, which is fairly satisfactory. The hull of such a vessel may be about 80-ft. long and in, say, 30-ft. of water the six moorings will extend some 200-ft. above, below and sideways from it, when in the middle position. If the barges have a capacity of 300 cu. yds., they will take three hours to fill (at the 70 cycles rate), and unless the distance to the disposal point is large, or the time of emptying prolonged, two such barges and one tow-boat will suffice.

Moorings

The large space required for mooring the usual type of dredger is a serious objection in wharf dredging. The fore and aft lines and anchors are apt to foul adjacent berths and the lines may become entangled with those of berthed ships. They obstruct the access to the wharf of boats and lighters and require appreciable time to shift when the dredger can no longer work within them. The anchors themselves are dangerous to ships, and must be marked with buoys. At the wharf side the dredger may be attached to bollards or other parts of the wharf, but the gradual swing of these shore lines may be inconvenient, and in the case of old wharves an undue strain may be put upon the structure. All these difficulties are reduced with spuds, which are vertical (or slightly inclined) columns which are housed into the hull of the dredger and sink into the river bed, and can be raised at will by winches on the dredger. On the other hand, the spuds are subject to very great bending moments, and must therefore be very strongly built. They are, therefore, expensive and heavy to manipulate and increase the size of the hull. To be effective they must penetrate well into the bottom, which is a difficult matter if the bottom is hard or very soft. With a grab dredger, side moorings are still required to enable the dredger to be moved, but with a dipper dredger the dipper

* Rates up to 120 cycles per hour are possible, but only occur with favorable materials, to which the plant happens to be just suited, and great skill and energy on the part of the operator.



Two grab dredgers especially constructed for dredging in Shanghai harbor

itself may be used to swing the vessel about one spud (the others being raised) so that the position may be gradually changed. This involves, however, a slight delay at each shift, whereas with moorings, the winch control can operate without delay until the moorings have to be moved and the dredger can be pulled up against the face of the cut.

Over Depth Dredging

In order to obtain a clear specified draught alongside, dredging must be done to a somewhat greater depth, because no type of dredger gives perfect control of the depth of the cut and some ridges or humps are bound to be left, especially with the grab type of dredger. This is a source of trouble, since it involves a larger volume of excavation, may increase subsequent reaccretion, and in some cases affects the stability of the wharf. Practiced dredger-masters can achieve very good results, but it should always be reckoned that the actual depth dredged will vary from nothing to perhaps 2 or 3-ft. below the prescribed level.

Measurement of Dredging

Whether the work be done for a lump sum or at an agreed unit price, either the contractor or the owner is interested in knowing how the actual volume removed compares with the previously estimated quantities and the barge measurements. It goes without saying that a careful survey should be made beforehand, but the estimates are never quite correct because of accretion or scour in the interim, errors in allowance for tide levels, softness of the bottom, swing of the sounding lines, etc. The quantity of material in the barges, if taken by the space occupied in the barge, is greater than the situ space occupied by the material on account of the water brought up and the interstices between the lumps. The surface of the material is also not level in the barge. If measured by weight (from the increased displacement of the barge), there is still an error due to the water brought up with the material. Measurements of the bed taken after dredging are again liable to the same errors as those taken before, plus the difficulty of an irregular bottom. In these circumstances, no real accuracy is possible. The practice with which the writer is familiar is to charge by the barge measure, in which it is assumed (on the basis of past measurements) that the material has expanded 40 per cent in excavation and by reason of water brought up. With very soft material, this is an over estimate of the expansion, but with hard material it may be too small. Soundings before, a rough estimate of quantities and soundings after dredging are supplied and the wharf owner can, of course, check all or any of these measurements.

Slipping from Under Wharf Decks

In the case of open wharves, accretion occurs under the deck, and when the back of the wharf is closed a slope is built up there, which tends to slip away when the front is dredged. This is an objectionable matter, because the slip may not occur until some time later, when it may annul part of the improvement. It can only be accelerated by over-dredging in front (which may be dangerous for the wharf) or by attacking the slope directly with digging tools or jets. The quantity of slip must be included in the estimates.

Disposal of the Spoil

It cannot be too strongly emphasized that the problem in dredging is not so much in the excavation as in the disposal of the material. In the majority of cases, it cannot be dumped into the water within a short distance from the site. Either it must be transported to a large distance, or it must be put ashore. Even the latter is frequently only possible at an appreciable distance. In either case, the spoil must be carried in a hopper barge (or in a hopper on the vessel itself).

Economics of Wharf Dredging

The cost of dredging depends principally on the nature of the material, the size and output of the dredger, the length of transport of the spoil and the facilities for disposing of the dredged material. Other factors that enter into the problem are the distance from which the dredger has to be brought, and the degree to which the normal business of the wharf is interfered with. If the wharf is

one at which every berth is normally occupied and a definite loss of wharf rent is involved, two alternatives present themselves. Either a very rapid dredging with comparatively large and efficient plant may be employed, one or more berths being out of use, or a small mobile dredger can be employed which takes the opportunity of working during the short intervals between the departures and arrivals of ships and operates outside the ships when they are berthed. Spud moorings are rather useful in the latter case, but are not very practical with small dredgers, and tow-boat service will also be required for the longer shifts. Furthermore, in this case, the excavation is likely to be very irregular and, if accretion is rapid, the results may be very unsatisfactory, and, owing to the large proportion of lost time and the comparative inefficiency of a small dredger, the unit cost will be high. This method can, therefore, only be recommended where accretion is small.

In the first alternative, it is essential that the dredger shall be in good condition and be supplied with ample barge and tow-boat service, and a time table for the job must be worked out as accurately as the conditions will permit. If the income from the wharf is, say, 2s. per foot per day (for berthage charges only), and the dredger occupies (including moorings and manœuvring space), say, 500-ft. of wharf, there is a loss of rental of, say, £50 per day. If the quantity to be dredged is, say, 24,000 cu. yds. and the unit price is, say, 1s. 8d. per cu. yd., the total cost of the dredging is £2,000 + (£50 × days occupied).

Thus, if the plant has a daily output of 1,000 cu. yds., the total cost is £3,200. With a daily output of only 500 cu. yds., the cost is increased to £4,400. With a daily output of 1,200 cu. yds., the cost is reduced to £3,000, which may be compared with that of a small mobile plant in which the unit price was increased (on account of lost time) to, say, 2s. 6d. per cu. yd. (with no lost rent), the total cost being again £3,000.

These figures are merely indicative of the principles, and no particular importance should be attached to them, as local conditions vary enormously. With still larger dredgers the total cost rises on account of the greater frontage required. Speaking generally, wharf owners prefer to put only one berth out of action, and this will limit the size of the dredging plant accordingly.

Some extra expense may also be incurred on the wharf by reason of greater haul of cargo to the warehouses, but as this is always a varying expense, this particular difference may often be disregarded.

Overtime and Night Working

In view of the great importance of rapidity, wharf owners often desire that riparian dredging shall be carried on continuously. This is not so simple as it seems, and will generally involve an increase in the unit price. If the mud disposal is done on a large scale, serving many jobs, and the other jobs are not continuously operated, a large mud disposal unit may require to be operated to serve a small input. The rapid manœuvring of barges, tow-boats and the dredger itself at night, is appreciably more hazardous than in the day. Special accommodation for extra crews will be involved. Night shifts may require higher pay. Extra expenses are involved in flood-lighting, signal lamps, etc., and the opportunities for running repairs are lacking.

Breakdowns

Owing to the great variations in inertial and induced stress on the various parts, dredging plant is very subject to sudden breakages. Builders of dredging plant will assure one that this is not the case, but it most certainly is. The design of a dredger is a compromise between the demand for strength, which involves mass, and the need for lightness, which implies weakness. Doubtless, the dredgers of the remote future will be made of duralumin! British types tend to err on the heavy side and break under inertial forces. Dutch and German types tend to err on the light side and break under mechanically induced forces. Consequently, ample supplies of spare parts and the best possible facilities for repair must be available, and it will occasionally happen that the progress of an important riparian job is suddenly interrupted. Whereas the contractor will doubtless have allowed for the cost of repairs, the real difficulty is the inconvenience and expense to which the wharf owner is put by the delay. The contract should make provision for this, and some form of insurance is really advisable, although the

(Continued on page 151)

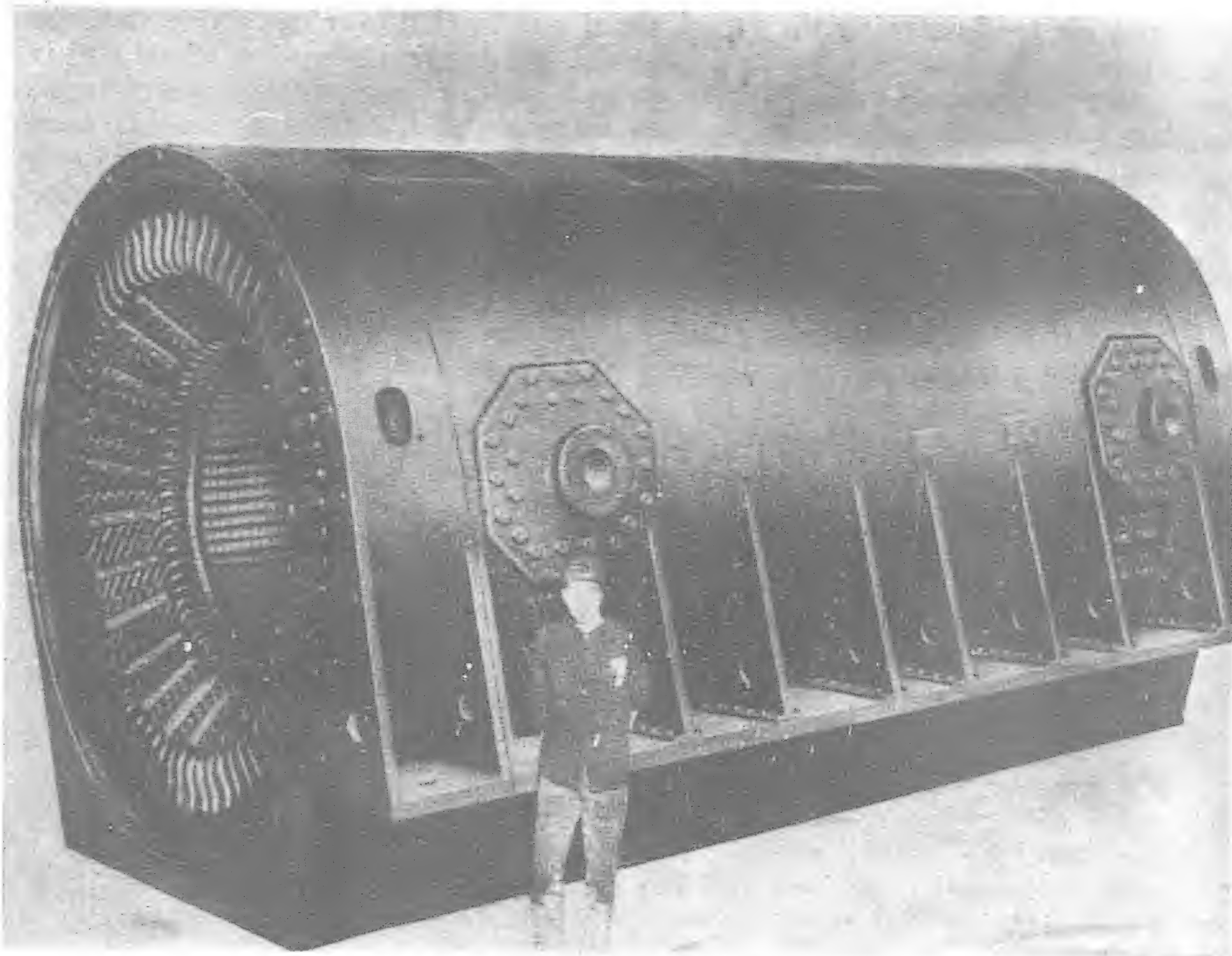
Electric Machinery Plays Important Part in Japan's Industries

Shibaura Products

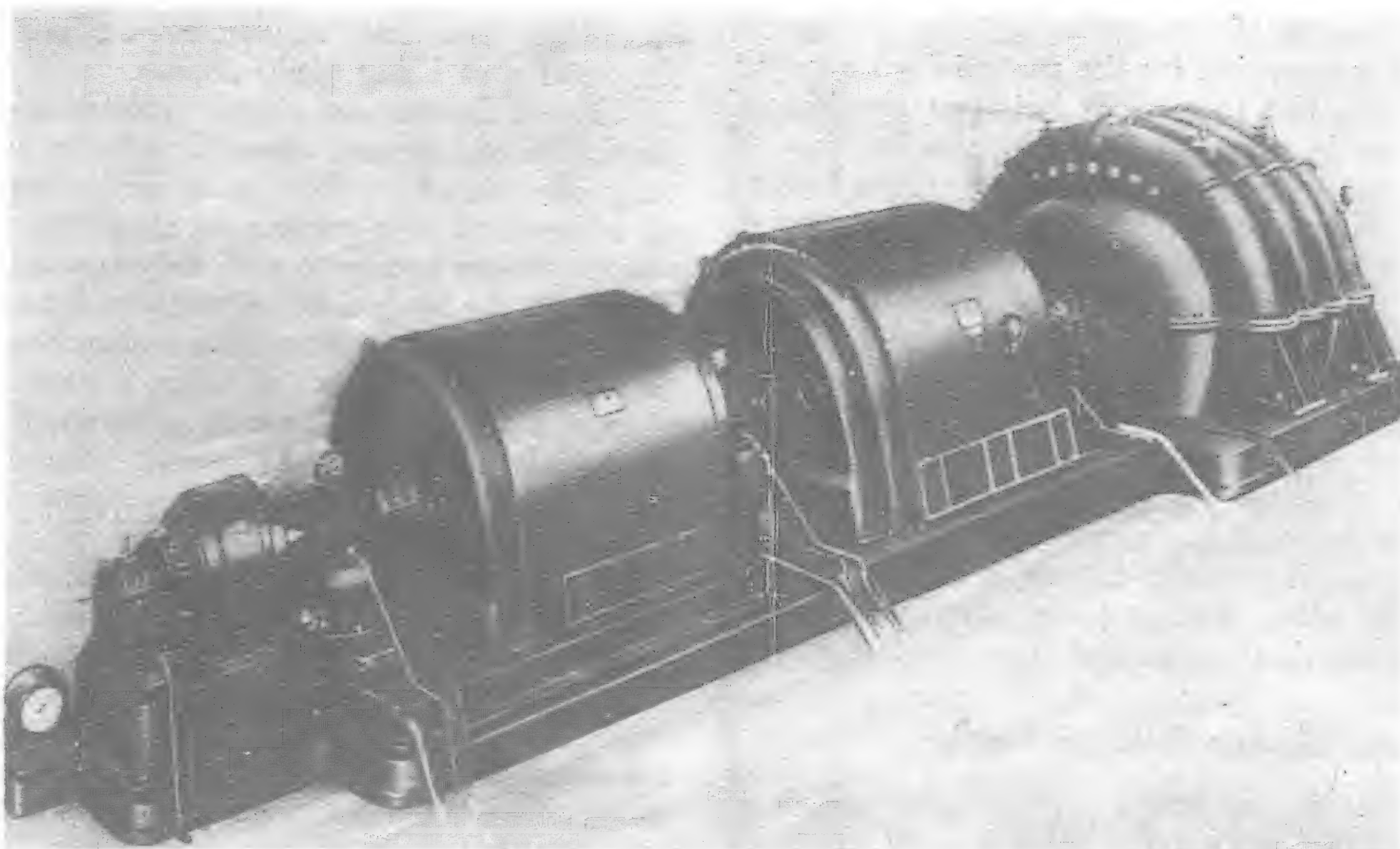
PRINCIPAL electrical machinery constructed by the Shibaura Engineering Works during 1938 are surveyed in the *Shibaura Review*, of which salient ones are a 93,750 kva turbine generator, 63,000 kva self-cooling transformers, a 22,800 kva arc suppressing reactor, and scores of heavy-current mercury arc rectifiers with rated output of several thousand kilowatts each.

Outstanding among those under construction at present also contained in the review are the world's largest 100,000 kva waterwheel generators, 100,000 kva and 80,000 kva transformers, both for 220 kv circuits, a 287 kv impulse circuit breaker and several large sets of electrical equipment for steel mills.

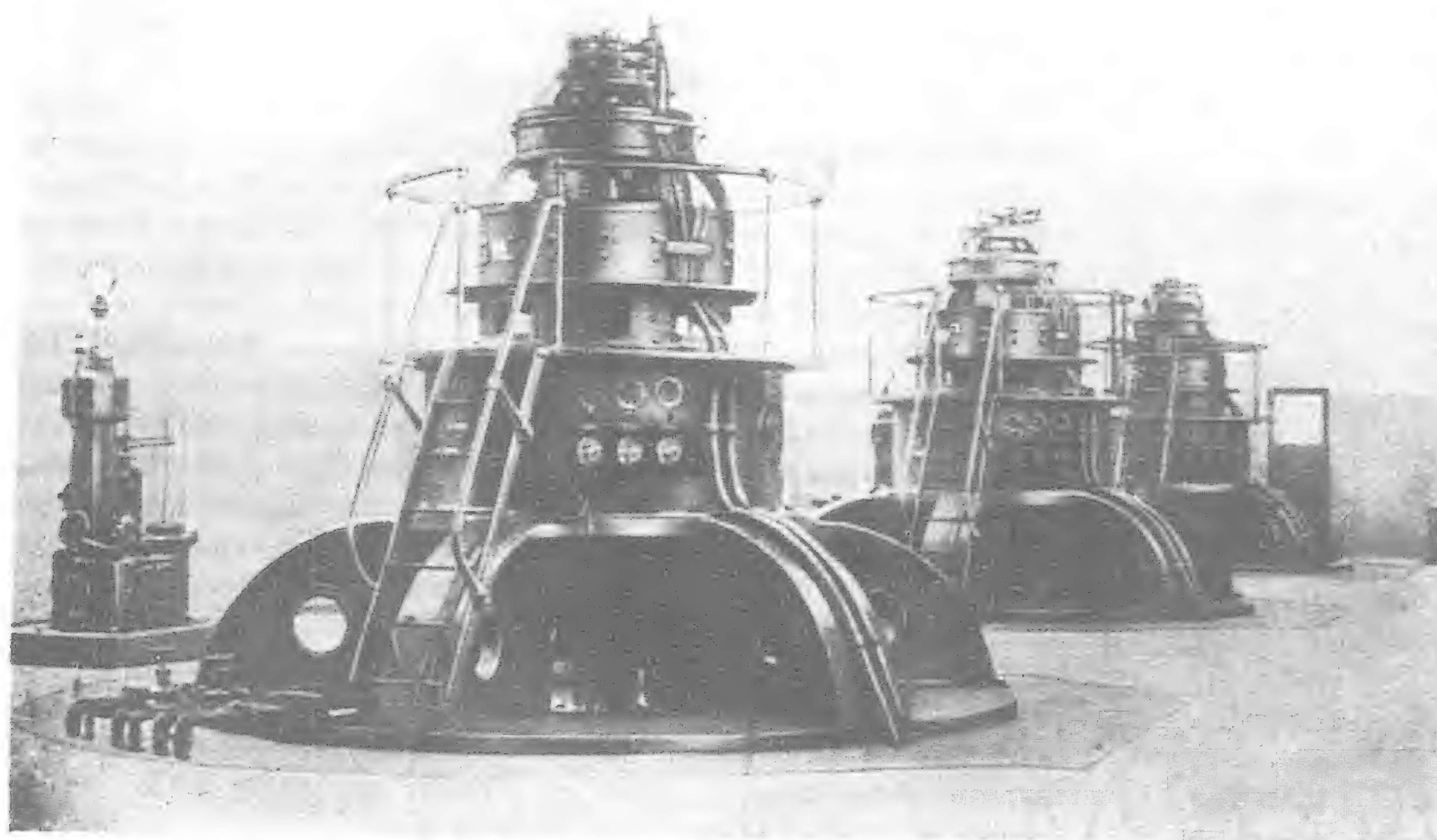
Of the turbine generators, the Shibaura Engineering Works built one of 93,750 kva and delivered it to the Amagasaki second power station of the Kansai Kyodo Karyoku Hatsuden Kaisha (Kansai Joint Steam Power Company, Ltd.). They had already delivered two 62,500 kva turbine generators rated 93,750 kva—1,800 r.p.m.—13,200-v. to the same company for installation at their first power station in the preceding year. Its rotor is of threepiece design. Of all machinery made this



93,750 kva. Turbine Generator



Synchronous motor, 5,000 h.p., 3,000 r.p.m., for turbo blower with a 1,500 h.p. induction synchronous motor for starting



13,500 kva. vertical water-wheel generator

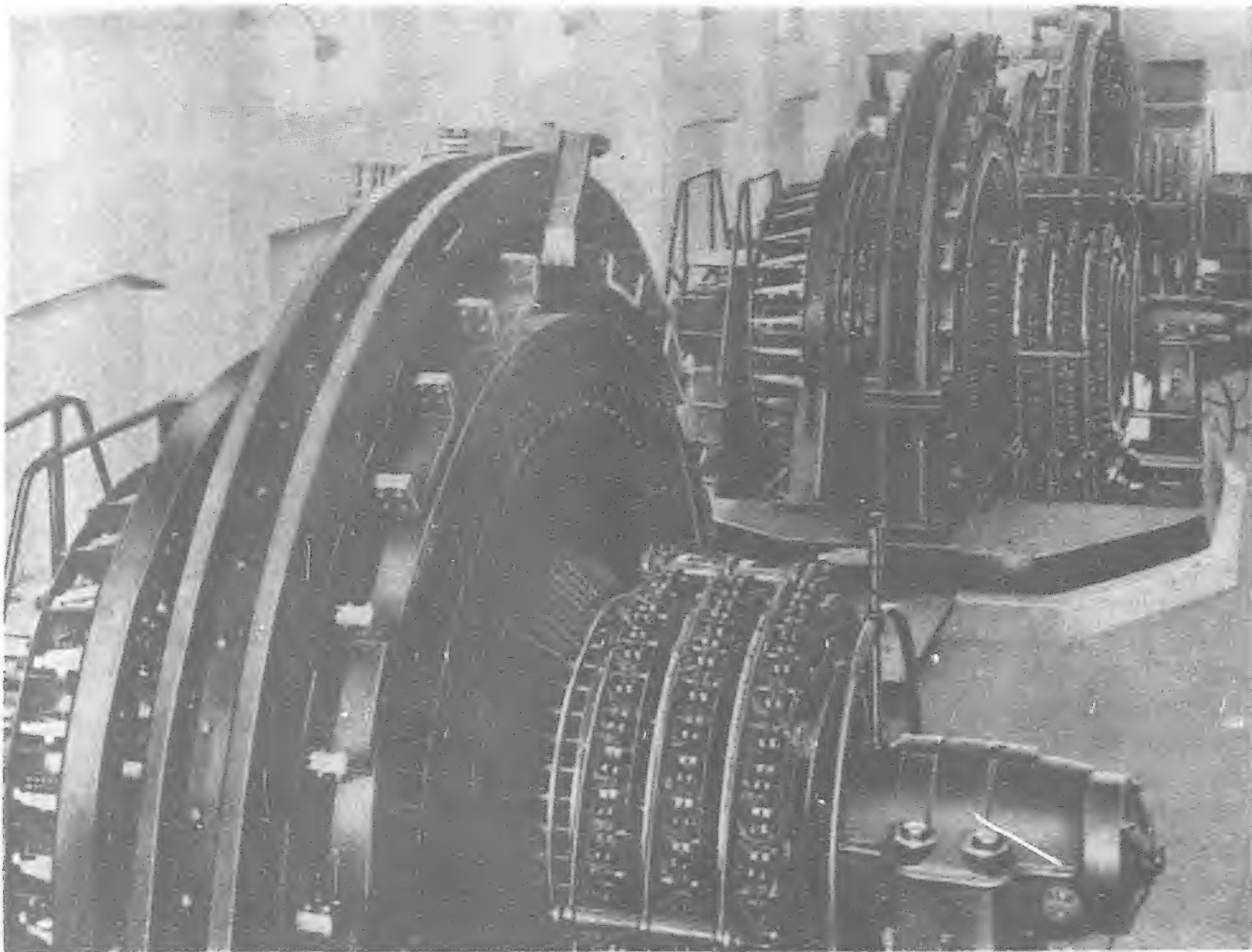
type of manufactures forms the nucleus of this concern.

Another item in this line is one rated 31,250 kva—3,600 r.p.m. 11,000-v. delivered to the second power plant at Ube of the Electric Bureau of Yamaguchi prefecture. This is exactly the same as the one delivered to the Chosen Denryoku Kaisha (the Chosen Electric Power Company) the year before last, and is the highest capacity type in this country.

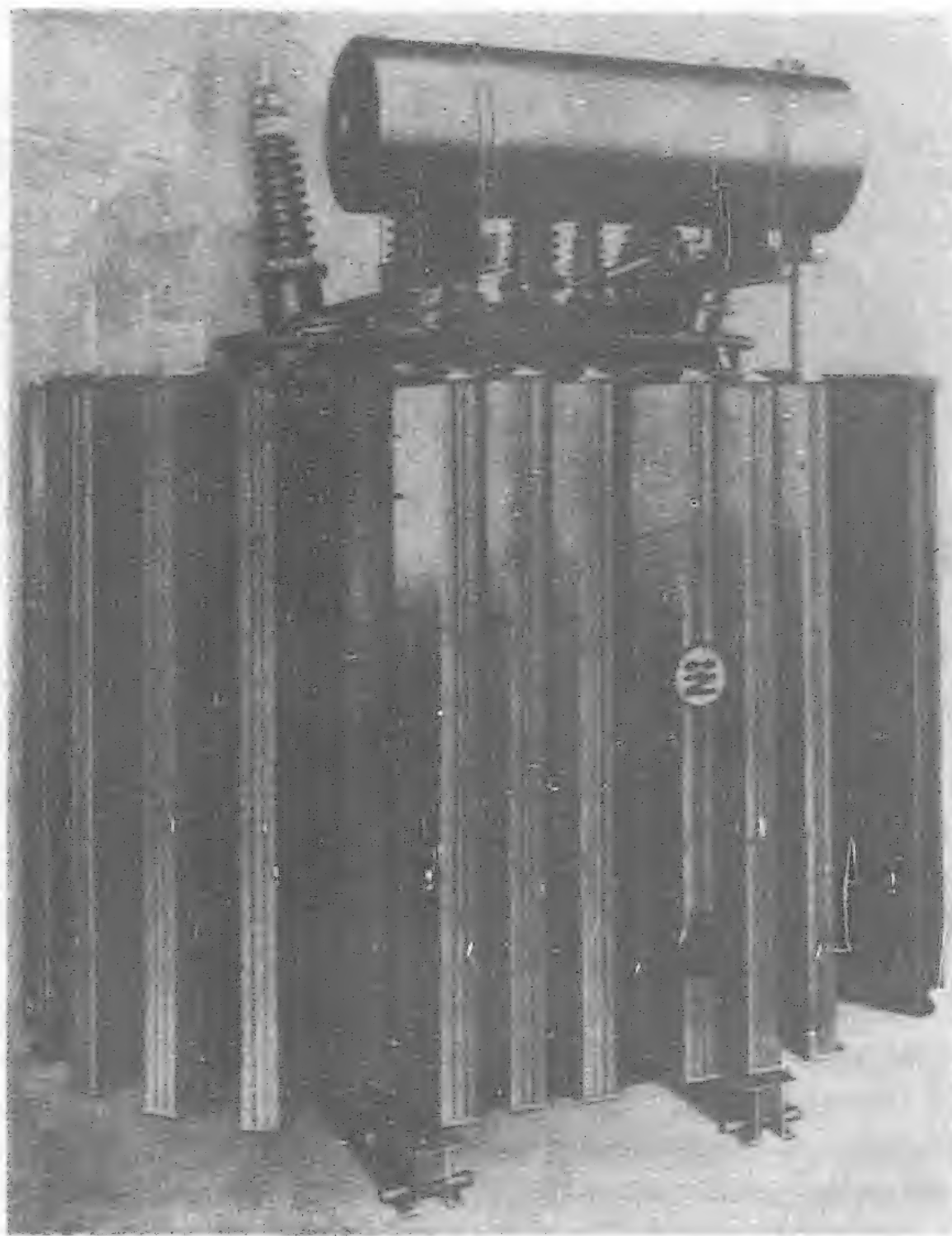
There were 17 water-wheel generators manufactured by Shibaura Works in the course of last year, of

which three 13,500 kva—360 r.p.m.—11,000-v. vertical turbines and two 13,125 kva—180 r.p.m.—11,000-v. turbines delivered to Nagatsue Hydro-Electric Company, Ltd., were the notable ones. Incidentally with the delivery of the three turbines, the Shibaura Engineering Works completed all the installation required by the said hydro-electric concern, and the total capacity is now said to be 370,000 kva. They are now building 21 water-wheel generators, of which three 100,000 kva models, the highest capacity generators in the world, are being made for the Ooryokko Suiden Kaisha (Yalu River Hydro-Electric Company).

Of the synchronous motors, the most notable was that delivered to the Yawata Steel Works. This outfit which is to operate turbo blowers for the blast furnace has the following rating: main synchronous motor, 2 pole—5,000 h.p.—3,000 r.p.m.—6,300-v. 50-cycles; induction synchronous motor for starting, 2 pole—1,500 h.p.—3,000 r.p.m.—6,300-v. 50-cycles and D. C. shunt exciter, 32 kw.—220-v.—3,000 r.p.m. The blower develops



4,950 kw. 330/250-V—15,000 rotary converter

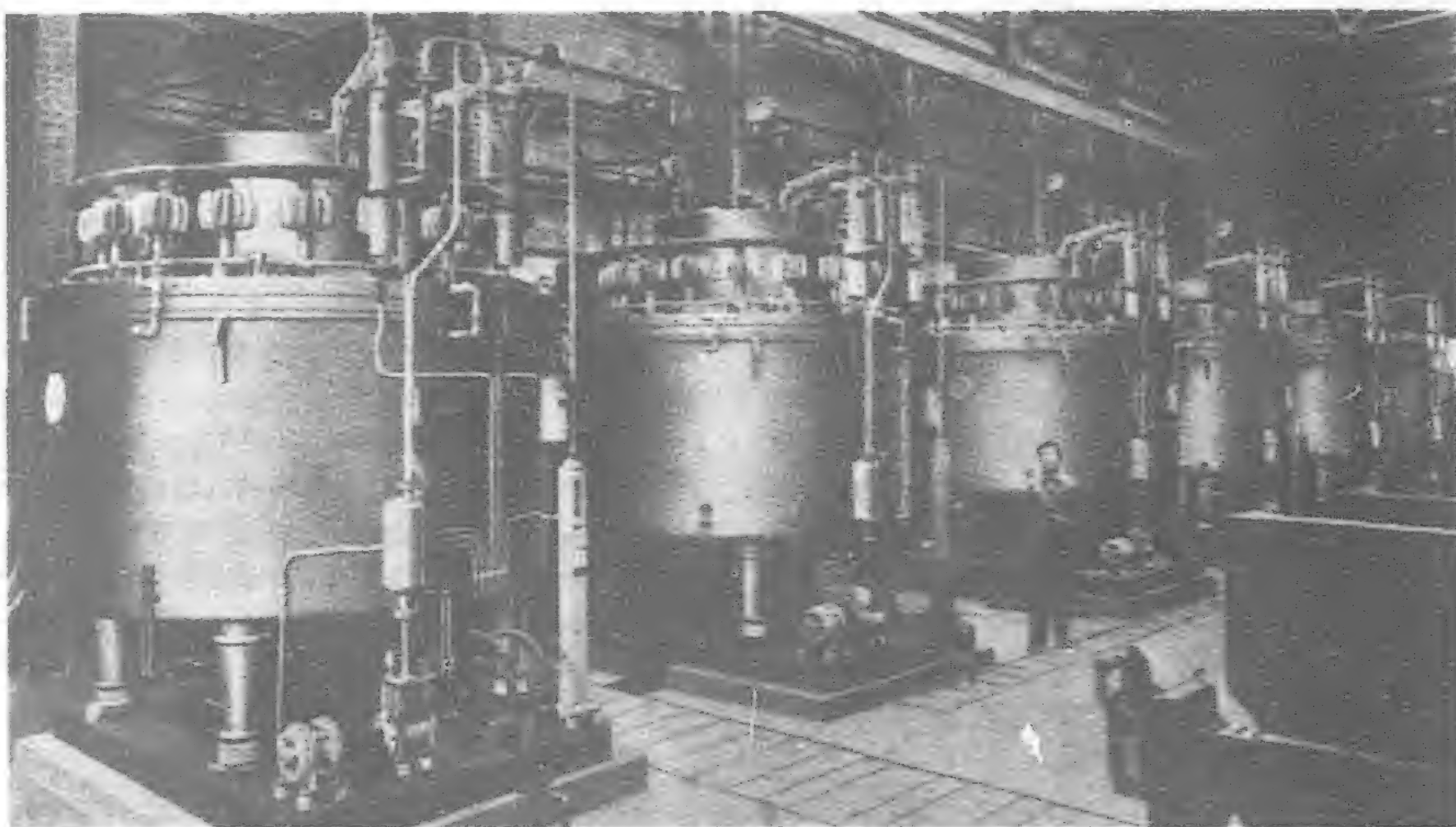


63,000 kva—77 kv—12.6 kv three-phase self-cooling transformer

a volume of 1,600—800 m³/min and air pressure of 1.8—0.6 kg/cm².

Of the number of machines manufactured by this concern in the line of direct current machines and current reversing equipment, one that has to be mentioned is a separately excited motor generator, 2 × 1,500 kw.—600/720 r.p.m.—220/350-v.—5,000 A. This was built for their own use for load testing of mercury rectifier for chemical purposes. They are also constructing at present a 1,500 kw.—125 r.p.m.—600-v. motor for testing 100,000 kva water-wheel generator, which is also under construction at this plant, for the Yalu River Hydro-Electric Company.

Restriction of steel materials and the remarkable development of the mercury rectifier reduced the demand for high tension



3,300 kw. 5,500 A mercury rectifier

in May last year. Subsequently one 2,400 kw.—600-v.—4,000 A grid control type mercury rectifier was built.

The manufacture of six rectifiers of 4,000 kw.—800-v.—5,000 A rating was begun last year and is in the process of being completed.

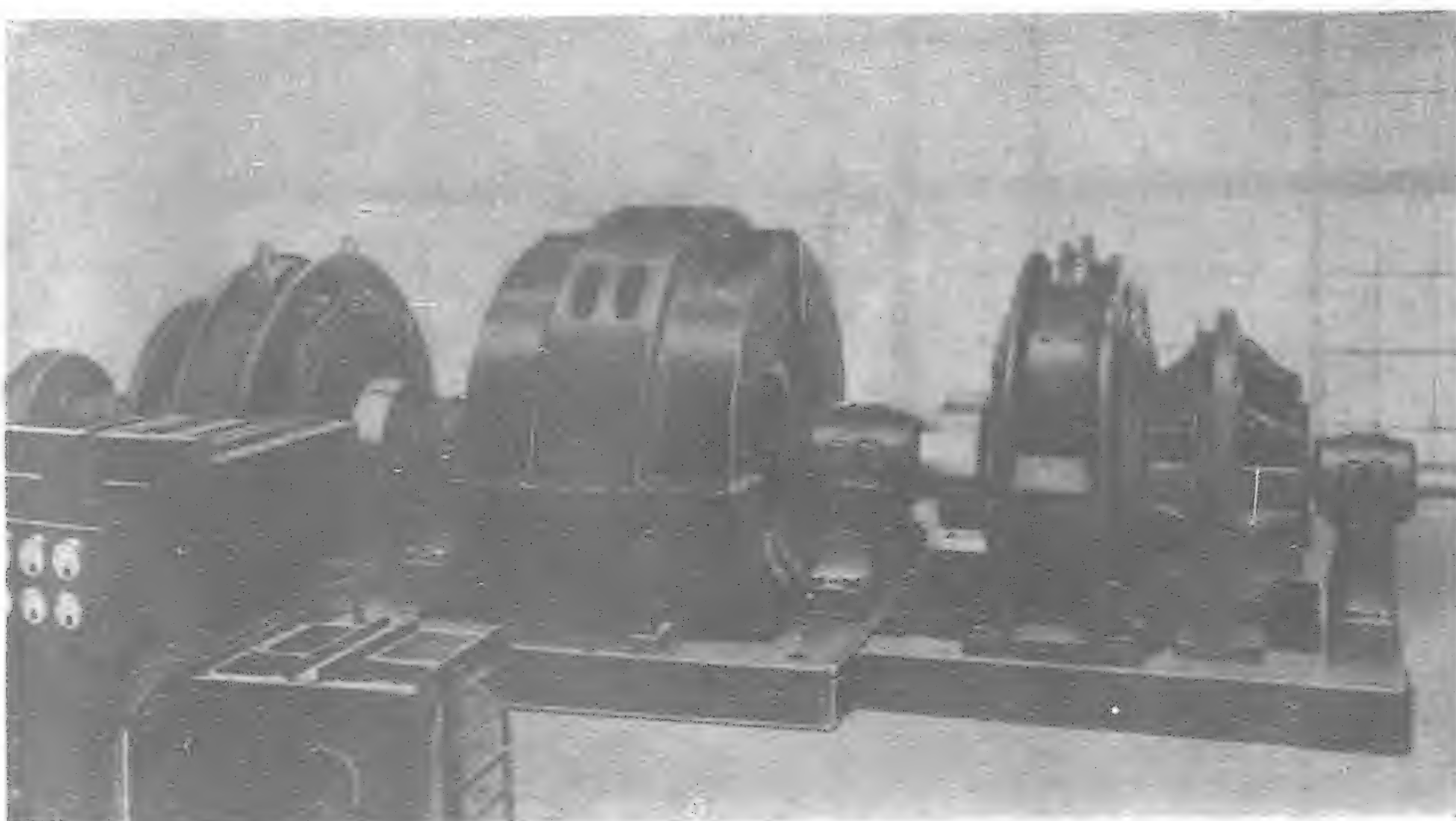
Besides there are some 60 rectifiers of varying capacities of 4,000 A, 5,000 A and 6,000 A for electro-chemical purposes in the course of construction.

Among the number of transformers built by this firm the three 63,000 kva—77 kv—12.6 kv three-phase self-cooling transformers were outstanding in the point of their output as self-cooling transformers. Each is equipped with a specially large size radiator.

The three 31,000 kva—161 kv—10.5 kv three-phase self-cooling transformers are in the course of construction and are to be delivered to a power generating station of the Railway Ministry along the Shinano River. Besides the foregoing some 27 transformers have so far been completed.

At present of the number of transformers being manufactured the two of 220 kv three-phase water cooling type, 80,000 kva and 40,000 kva respectively for the Nagatsue Hydro-Electric Company are notable ones.

(Continued on page 155)



Two by 1,500 kw. 220/350-v. motor generator for load testing of mercury rectifier

The Malakand Hydro-Electric Scheme

By H. L. BAZALGETTE, A.C.G.I., A.M.Inst.C.E., A.M.I.E.E.

ON April 23, 1938, H.E. the Viceroy of India, the Marquess of Linlithgow, accompanied by Sir George Cunningham, Governor of North-West Frontier Province, and Dr. Khan Sahib, the Premier, was present at the opening of the Malakand Hydro-Electric Scheme and, by closing a switch, started up the turbines and thus signalized the completion of the first important work executed by the Province since it achieved autonomy.

The power station lies in a district rich in historic interest in connection with past frontier campaigns and a supply of electricity is now available to the towns and cantonments bearing the well-known names of Dargai, Mardan, Nowshera, Peshawar, Charsadda and Risalpur, with the likelihood of early extension to other centers.

The difficulties met with in the execution of a scheme of this nature in a remote and mountainous district subject to earthquakes, dust storms and extreme variations in temperature and not devoid of danger from hostile tribesmen, cannot be exaggerated, and the Public Works Department are to be congratulated on a very notable achievement. Some idea of the nature of the country can be obtained from the illustration showing the power station site, and from Figs. 1 and 2 which show views of the Khyber Pass in the immediate neighborhood.

It is gratifying that the English Electric Company was able to take a prominent part in this work and, by the successful completion of its contract comprising the pipelines, valves, water turbines, generators and haulage gear, the Company again demonstrated its ability to execute comprehensive hydro-electric contracts in any part of the world and under the most exacting conditions.

Layout of the Scheme

The possibility of generating electricity at Malakand was first recognized some 25 years ago by the irrigation engineers of the Punjab, of which the present North-West Frontier Province was then an outlying district, and it was seen that the waters of the Swat River to the north of Malakand could be used for fertilizing the north-eastern part of the Peshawar Valley by driving a tunnel under the Malakand Pass and by constructing a canal. The tunnel, known as the Benton tunnel, was duly completed and it was evident that by extending it another half mile to a point above the Upper Swat Canal advantage could be taken of a natural fall of some 250 feet for the production of electricity. The scheme was sanctioned in 1934 and the new tunnel 12 feet in diameter, which was called the Burkitt tunnel after Mr. F. H. Burkitt, C.I.E., Chief Engineer to the North-West Frontier Province, was put in hand, the construction being undertaken by local labor and without the aid of machinery.

The hydraulic works provide for an ultimate installation at the Jabhan Power House below Malakand Fort of six generating units, but for the first stage only three sets each 3,200 kw. have been installed.

The power is generated at 11 kv. and stepped up to 66 kv. and transmitted 30 miles by a double circuit line to Mardan and thence by single circuit line for a further distance of 74 miles to Charsadda, Risalpur, Nowshera and Peshawar Cantonments. Substations for 66 kv. have been established at four important centers and 11 kv. branch

transmission lines totalling 37 miles, with nine 11 kv. substations at convenient points, constitute the distributing system.

The scheme had the advantage of the initial load available in the area at the numerous military establishments which in turn benefitted by receiving a cheaper supply and by being able to shut down numerous small plants. It is anticipated that a supply of electricity at low cost will lead to the development of natural resources and the creation of industries within a Province which is remote from other sources of energy such as coal and oil. In addition the scheme, when fully developed, will materially benefit the Province by increasing revenue and providing a high return on the capital expended.

English Electric Company's Contract

The main contract for the generating plant was placed with this Company in January, 1936, and comprised three 4,500 h.p. water turbines and generators, main inlet valves, penstock pipelines and forebay valves, trash racks, haulage gear, etc. It was, therefore, of a comprehensive and important character embracing the whole of the equipment from the forebay down to the generators.

At the tail of the Benton tunnel referred to above the water is discharged over a regulating weir into the new power tunnel which runs parallel to the Dargai Nullah (formerly carrying the water from the Benton tunnel exit to the Upper Swat Canal System) until a difference in level of 250 feet is obtained down to the nullah bed. Here the water emerges from the power tunnel into an open channel and forebay and thence via penstock pipes to the power house. At the power tunnel exit there is a stilling pond which reduces the velocity of the water causing the deposition of silt which gradually moves forward and is drawn through vents in the channel below and removed automatically.

In the open channel there is a waste weir and spillway syphon, the function of the latter device being to allow evacuation of excess water automatically, in the event of sudden closure of the turbines, with only slight fluctuation in the level upstream.



The Malakand Power Station showing Penstocks and Forebay



Figs. 1 and 2.—The two pictures above are of the storied Khyber Pass

The three penstock pipes connecting the forebay to the three turbines were supplied by Messrs. Stewarts and Lloyds, Ltd., under a sub-contract, and are each 515 feet in overall length. They are in two sections, a stop section running between the forebay and a concrete anchor block, and a lower section between the anchor block and the power station. The pipes comprising the top section are 61-in. external diameter and $\frac{1}{2}$ -in. thick and those of the bottom section are 55-in. external diameter and $\frac{3}{8}$ -in. thick. The pipes are in 26-ft. lengths with longitudinal seams hydraulic roller lap welded by the watergas process. Double riveted bump joints are adopted throughout except at and around bends, at valves, and at terminal ends where welded flange joints are used. Expansion joints are provided for each section of pipe between anchor blocks. The pipelines were designed for a maximum static head of 250 feet (approx. 108 lbs./sq. in.) and for a test pressure of 115 lbs./sq. in. on the upper section between the forebay and the middle anchor block, and of 195 lbs./sq. in. on the lower section.

Each pipeline is provided with a trash screen consisting of flat steel bars $2\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. with 2-in. spacing to protect the turbines from debris.

Haulage Gear

Also included in the Company's contract was the haulage gear for the pipeline haulage way which can be seen in Fig. 3. This haulage way which is of metre gauge was not only indispensable during construction for the erection of the pipeline sections but is also now very useful as a means of access between power station and forebay and for conveyance of loads between the two points. The gear, which was supplied by Messrs. Hatfield, Perrin & Partners under a sub-contract, consists of an electrically driven haulage winch to haul a total load of $6\frac{3}{4}$ tons up a maximum incline of $32^{\circ} 16'$ at a speed of 50-ft. per minute, together with a four-wheeled truck and wire rope guaranteed for an actual breaking load of 30.7 tons.

Located in the forebay are three balanced disc butterfly valves of the self-closing type, 60-in. internal diameter, supplied by Messrs. de Roll, of Klus, Switzerland.

The valve door is operated by weights mounted on arms attached to the door spindle, an oil-dashpot prevents slam shutting, and a hand-gear allows of the re-raising of the weights after operation.



Fig. 3.—Forebay, penstocks and haulage way

The tripping gear is of the usual paddle trip type, and is designed to operate at varying excess velocities.

Turbine Inlet Valves

At the turbine inlets are provided "English Electric" streamline cylindrical balanced valves of the Company's well-known patented type. These valves, which are 42-in. bore, are designed to obtain complete security for the turbine plant and therefore, fulfil a very important function in the whole installation. This type of valve has been described many times, but it may be useful to recall the following features which render it certain of satisfactory operation under both normal and emergency conditions:—

- (1) The valve piston, which is a cylinder and thus remains always balanced, requires only a small force to move it and is inherently free from distortion and jamming.
- (2) The operating servo-motor directly surrounds the piston and has a very large margin of power.
- (3) The travelling control screw, which is an especially interesting and effective device, in combination with the balanced cylindrical piston makes water hammer an impossibility. The screw moves with the piston and by this means obliges the pressure water supply to the servo-motor to traverse an ever increasing number of screw threads as the closing stroke is performed. The last part of the piston movement is, therefore, very slow and this prevents pressure rise, but not at the expense of the total closing time which remains reasonably short.
- (4) The careful streamlining of the valve ensures that there is no obstruction to the flow.

The main parts of the valve are made of cast iron with rust protection where necessary. Fig. 4 shows one of the cylindrical balanced inlet valves assembled at Rugby Works.

Power House

The Power House containing the generating plant occupies a site on the west bank of Dargai Nullah, immediately below Malakand Fort, and lies at an altitude of 1,750-ft.

All consignments of plant were taken by train from Karachi to Dargai railway station, a distance of about 1,000 miles, and thence transported by lorry over an old Buddhist

road by which Alexander the Great invaded India. The power house and its surroundings are shown in the illustration accompanying and the buildings comprising Malakand Fort can be seen at the top of the picture.

It will be noted that the forebay works have been arranged to accommodate another three pipelines in the future.

On the left of the picture is the step-up transformer station which is connected with the power house by a bridge over the spillway channel; this channel receives the spill nullah which can be seen descending the hillside to the left.

The power house contains three horizontal reaction water turbines each capable of a full load output of 4,500 b.h.p., an overload output of 4,750 b.h.p. when running under a net head of 243 feet and at a speed of 600 r.p.m. The turbines drive three 3,200 kw. 3-phase alternators designed for 0.85 power factor lagging, 11,000 volts, 50 cycles and fitted with main and pilot exciters. Plates Nos. I and II show cross sections through the Turbine and Alternator respectively.

Turbines

The turbines are of the overhung type having no shaft or bearings of their own, the runners being fitted to the ends of the generator shafts. This compact construction is now practically standard for the Company's horizontal units since it is a product of that close co-operation between mechanical and electrical designers which the Company is able to secure by virtue of the fact that it manufactures both ends of the combined unit.

The spiral casing, which is shown assembled at the Company's Rugby Works in Fig. 5, is of the usual logarithmic form and is fabricated from mild steel plates graduated in thickness from $\frac{1}{2}$ -in. to $\frac{3}{8}$ -in. It has an inlet diameter of 42-in., and is practically circular in cross section in order to prevent distortion under pressure, with butt joints between segments and double-welded lap joints where it joins the speedring, the plates fitting inside the speedring flanges.

The speedring is made of fabricated steel bridging the throat gap of the spiral casing and consists of two massive forged steel guide rings rigidly tied together by strong nickel-steel stays.

Strong bracket feet are provided on the casing and these are bolted down to the combined bedplate of the unit. A branch is provided for connection to the relief valve. In order to obtain a rigid setting the bottom part of the casing and the bedplate are drowned in concrete.

The gate apparatus consists of a set of swivel gates of stainless steel cast integral with their stems which are protected by special collars. When closed the gates make contact with each other along machined bearing strips so that leakage is reduced to a minimum. The swivel gates are coupled by cast iron levers and links to a regulating ring sliding on gun metal pads and connected by adjustable gear direct to the governor. The connecting gear between gates and ring is "offset" so as to reduce the regulating energy by making the quantity of water shut off or admitted by the gates generally proportional to the governor stroke. Should

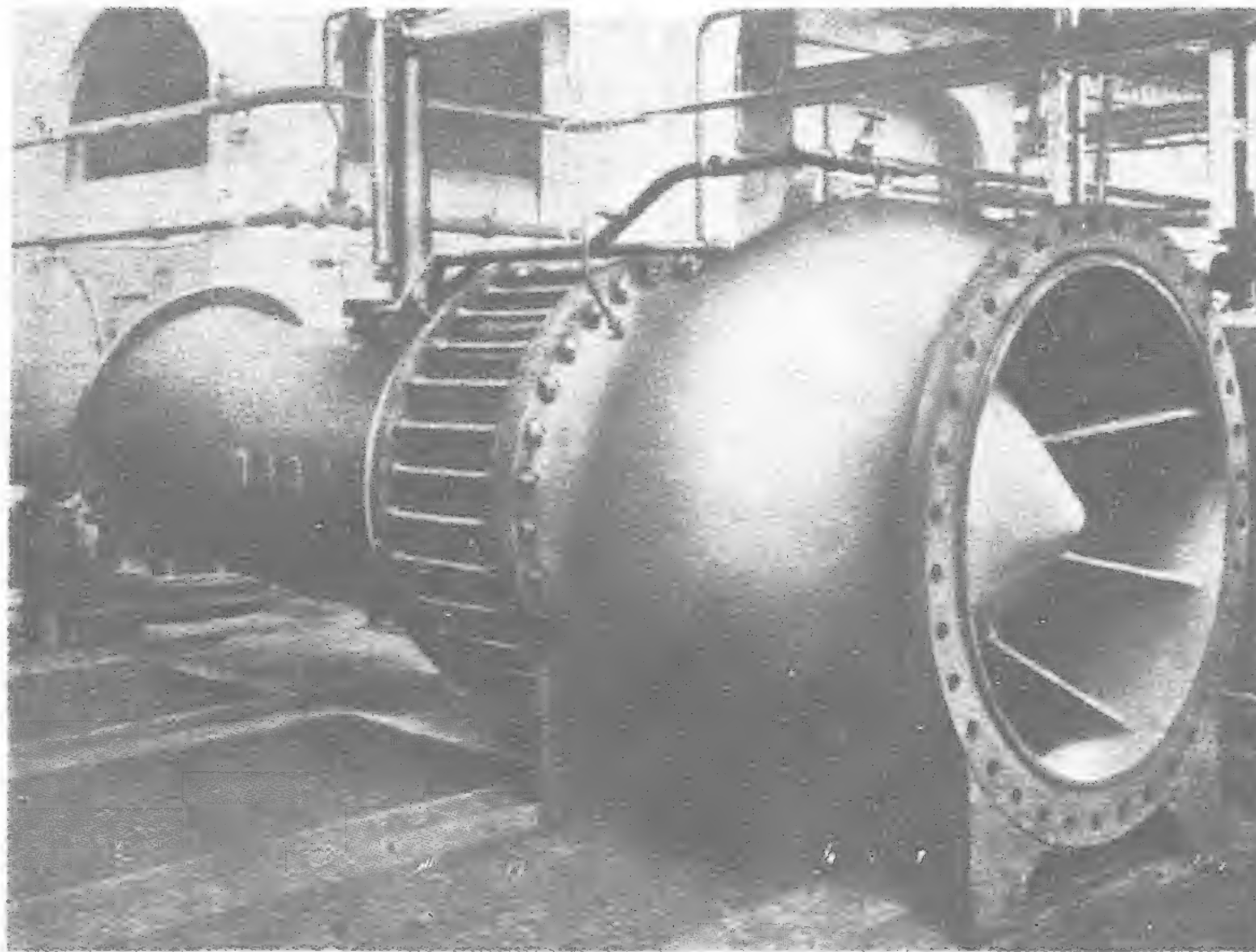


Fig. 4.—Cylindrical balanced turbine inlet valve at works

an obstruction prevent one of the gates from following the regulating ring, the links are designed to break well before the elastic limit of any more important part of the apparatus is reached. These links are a cheap and simple spare part which are easily renewable in service.

In the event of a gate becoming uncoupled the design is such that it cannot foul any of the other gates or the runner. To permit of adjustment to every individual gate both in the shops and in the field, each link is fitted with an eccentric pin and, by turning and then locking the latter, the distance between pin centers (i.e., the effective length of a link) can be varied and a gate can be shifted as desired. Fig. 5 shows the

regulating gear assembled on the spiral casing at Rugby Works.

The turbine main cover carries the regulating ring and gland and is of strong box construction. It contains passages for the evacuation of any leakage water passing through the runner seals, and these lead to a pipe discharging into the tail race. By this means water will not be trapped in the space between runner crown and cover and the hydraulic end-thrust on the wheel will be reduced, especially at runaway. Although reduction of hydraulic thrust is, therefore, inherent in this design, additional security is obtained by providing a Michell thrust block in the inboard generator bearing.

The shaft gland is cooled by filtered water and is well lubricated; packing rings of special material which does not react on the metal are used.

The turbine runner is made of high-grade stainless steel carefully streamlined, ground and polished. As the turbines have to operate at an altitude of 1,750 feet above sea level and run at a speed of 600 r.p.m., the question of security against cavitation required careful study. This security was attained by adopting liberal dimensions for the runner so as to reduce the velocity of the water passing through it and, therefore, the dynamic suction at the outlet of the vanes, and by the provision of the minimum number of vanes in order to occupy less room in the water stream. The vanes and the passages between them were also carefully streamlined and the use of stainless steel with all surfaces worked smooth afforded a further safeguard.

The seal with the turbine guide wheel covers is effected by means of brass rings hammered into grooves in the crown of the runner, the brass being a soft material is worked down to the exact bore of the covers leaving only a fine running clearance. Thus there is very little leakage.

To relieve the pipeline and avoid excessive pressure rise due to load fluctuations the turbines are provided with cylindrical balanced streamline relief valves. These are so connected to the spiral casing that they form a continuation of the pipelines and the water passes smoothly into the tailrace without causing chattering or erosion.

The design is very similar to that of the cylindrical balanced inlet valve embodying a balanced piston requiring only a small force for operation and it thus moves smoothly and in exact synchronism with the rapid turbine gate closure.

The central cone of the inner body of the relief valve causes the rapid dissipation of the energy of the incoming water in the form of a fine spray, a

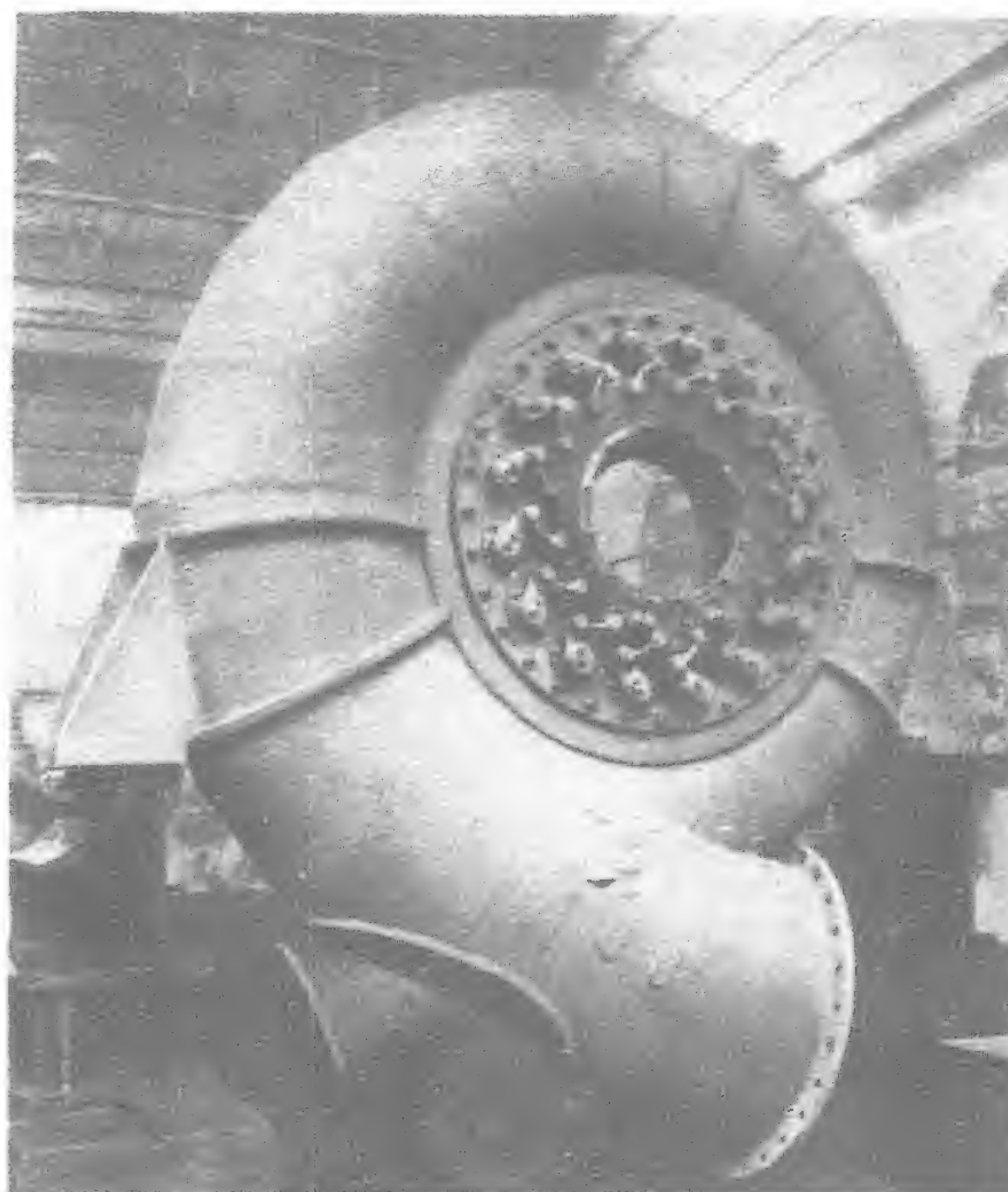


Fig. 5.—Turbine spiral casing with swivel gate levers and links

particularly valuable feature in the present case owing to the narrow channel into which the water has to be discharged.

The governor is of the Company's standard oil pressure type, the actuator being driven from the main shaft by means of a flexible gear drive.

The governing equipment which has been described in detail on former occasions, is shown in Fig. 6. The turbine gates are opened and closed by a regulating ring which, in turn, is operated by a regulating shaft connected to an oil servomotor which can be seen in the foreground.

The servomotor cylinder contains a double-acting piston, and a handgear and clutch is provided for manual control when desired. The servomotor receives its pressure oil at 180 lbs./sq. in. from an oil pump driven by an electric motor which can be seen to the right of the generator in Fig. 8. Beside the oil pumping set is the oil-pressure

receiver, the function of which is to act as a pressure reservoir and to maintain the oil pressure at its correct value. Safety and by-pass valves are provided. Mounted above the servomotor is the governor actuator which has been well described as the "brain" of the whole plant.

This, as already stated, is driven from the main shaft by means of gears and a horizontal shaft which can be clearly seen in Fig. 6. This shaft drives a pendulum within the actuator which operates a distributing valve and thus controls the pressure oil to the servomotor. Incorporated in the mechanism is a safety device to close the turbine in the event of overspeed, oil

pressure failure or underspeed, with an auxiliary contact to open a tripping circuit and thereby cause the complete shut-down of the unit. The tripping circuit can also be opened and the set shut down from the switchboard. A neat instrument panel is



Fig. 6.—4,750 h.p. Set in Power Station showing governor gear

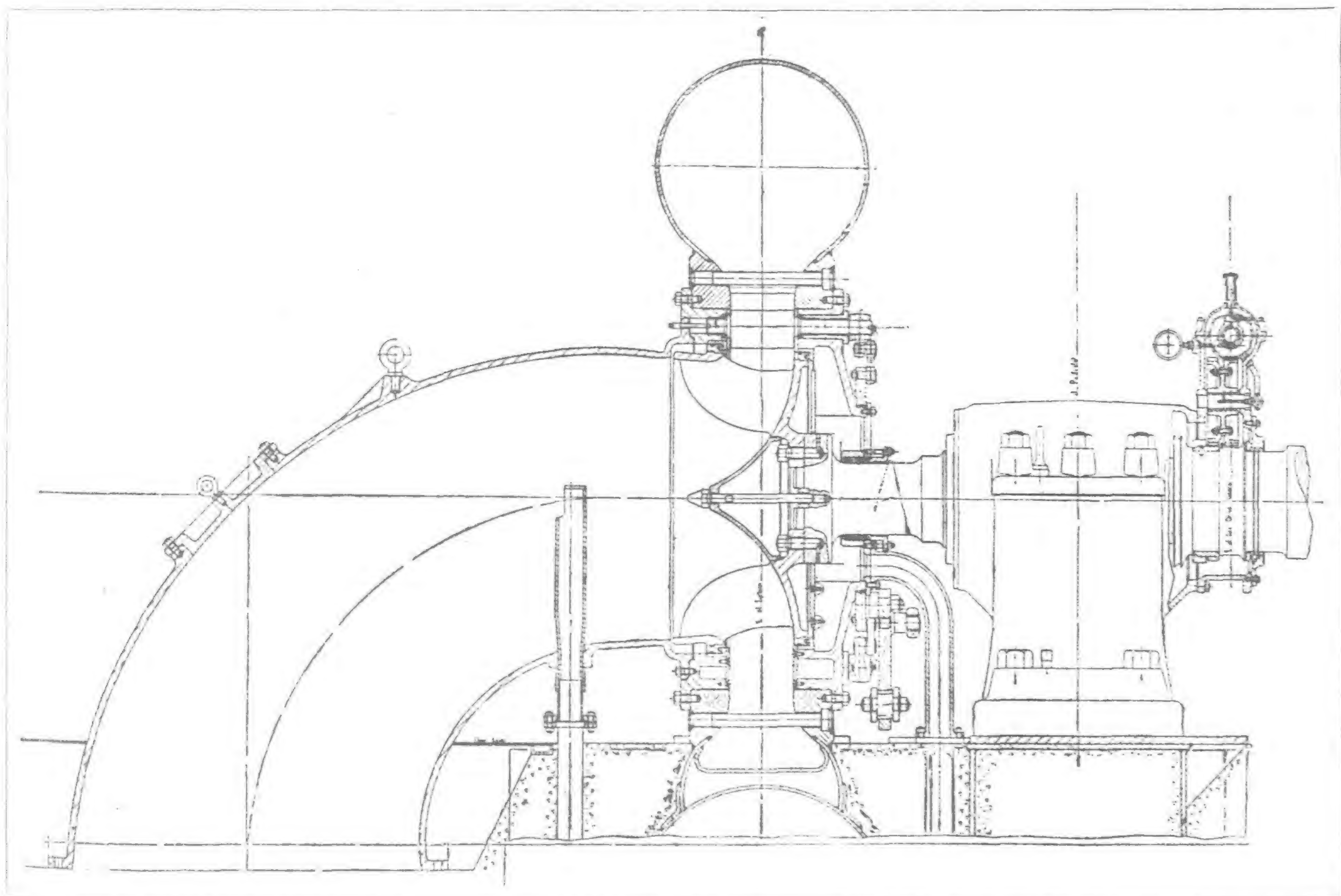


Plate 1.—Cross-section through 4,500 h.p. horizontal-reaction water turbine

provided for the pressure and vacuum gauges.

The governing system was subjected to rigorous and extensive tests before shipment and the whole equipment was erected on site and put into service with the minimum of adjustment.

Alternators

The alternators have a maximum continuous rating of 3,760 kva. and are designed for a normal speed of 600 r.p.m. and a runaway speeds of 1,100 r.p.m. They are wound for three-phase, 11,000-volts normal, 50-cycles. The machines have horizontal shafts running in two main bearings and each machine has a main exciter and a pilot exciter with a bearing between the two. The machine is mounted on a fabricated steel bedplate and the exciter rests on a separate bedplate bolted to the main bedplate.

The alternator frame is of welded steel construction in a single piece and has sufficient depth of section to ensure an adequate volume of ventilating air which is discharged into it and thence to a discharge duct in the foundation via a bottom chimney.

The stator winding is of the two-layer or basket-type with Class "B" insulation throughout, all coils being alike and interchangeable.

Well-seasoned impregnated hardwood wedges retain the coils in the slots and the end part of the winding is fixed in position by hardwood blocks between coil limbs which are lashed back to mica-insulated support rings bolted to the stator endplates.

This type of winding is especially suitable for withstanding surges and the forces set up on short circuits.

In order to eliminate as far as possible harmonics from the terminal wave pressure, advantage is taken of the possibility of using a fractional number of slots per pole combined with a short pitch to obtain a balanced symmetrical three-phase winding.

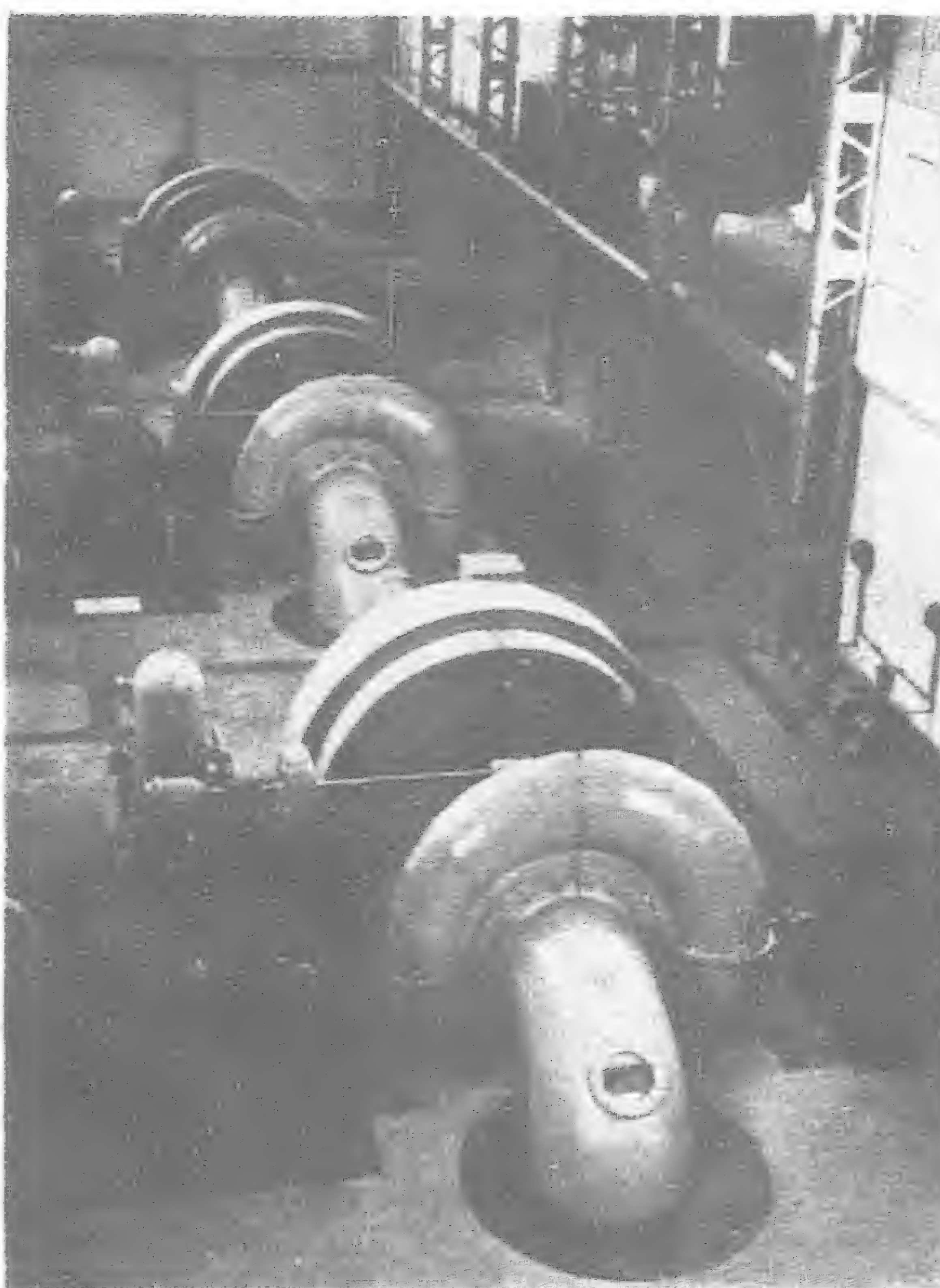


Fig. 7.—Three 4,750 h.p. Sets in the Power Station viewed from turbine ends

Copper constantan thermo-couples are embedded in the stator winding to give an indication of the temperature at various points. These are connected to a terminal box on the stator frame and a suitable indicating instrument with motor-driven selector switch is provided to connect in circuit each thermo-couple in turn, thus giving an alarm if the temperature of any one exceeds a predetermined value.

The rotor body is shrunk on the shaft and is built up of $\frac{1}{2}$ -in. rolled-steel plates clamped by rivets between end plates. The solid body thus formed is machined and dovetails are cut in the periphery to receive the poles, which are built up of laminated steel stampings.

In order to obtain satisfactory parallel operation and ensure stability on the system under disturbances caused by high and low-frequency transients, the pole faces are provided with a damper winding consisting of copper rods in semi-closed slots brazed into copper short-circuiting end-segments. The field coils are formed of copper strip wound on edge mounted on sheet-steel spools, the insulation being Class "B" throughout and mica insulation being provided between turns and to earth.

The machine is ventilated by the provision of a fan at each end of the rotor and air is drawn in at both ends from the pit through sheet-steel trunks secured to the end-shields. The rotor fans and the fanning action of the pole forces the air through radial ducts in the stator core and a portion of the air is bye-passed across the end-windings. The discharged air passes circumferentially round the stator frame and is discharged through a bottom chimney to a discharge duct in the foundations. A viscous air filter is provided in the inlet and electrically-operated dampers are provided in both inlet and outlet ducts to stop the air circulation in case of emergency.

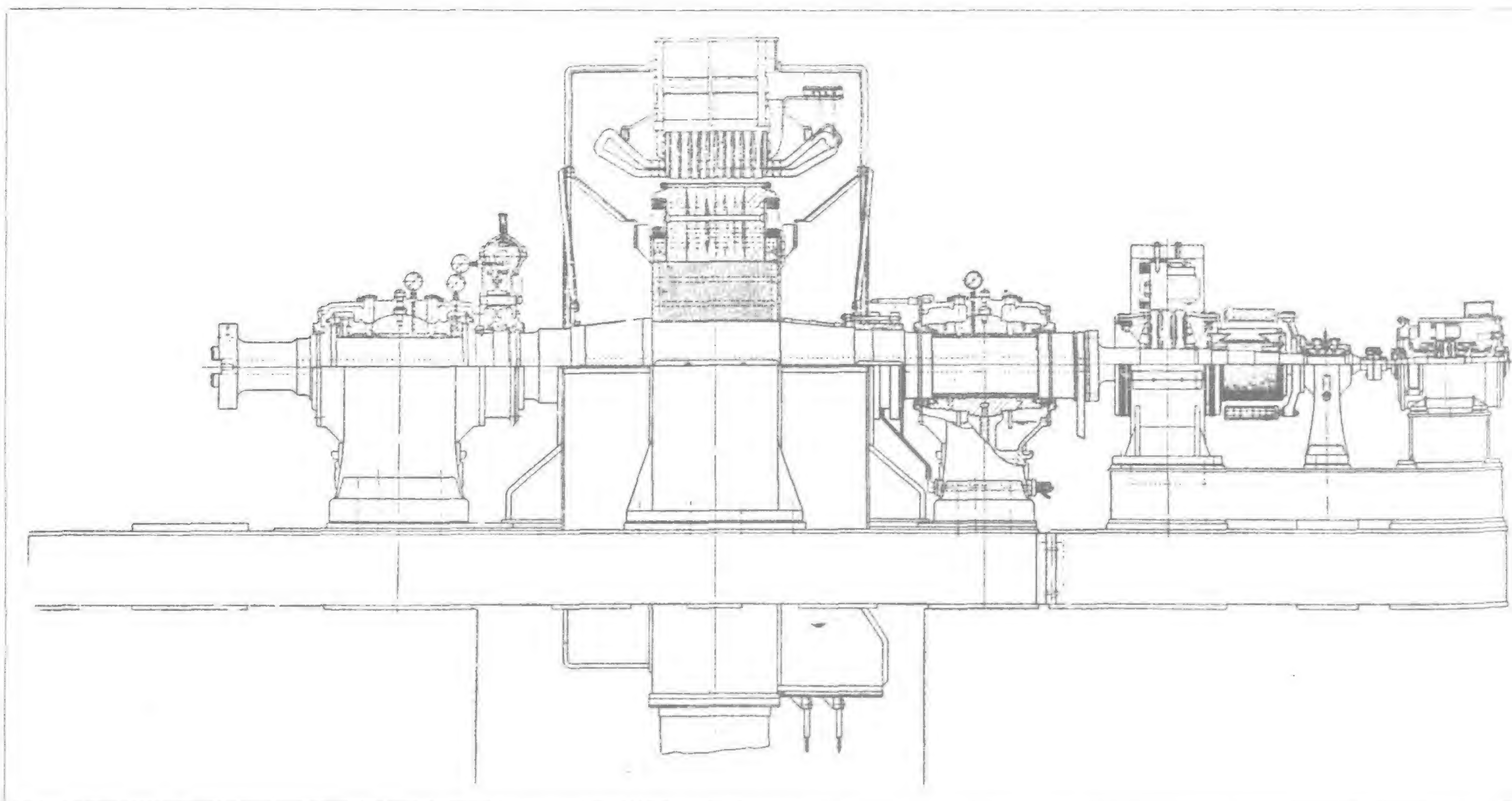


Plate 2.—Cross-section through 3,200 kw. water turbine-driven alternator

The main bearings are of the self-aligning, spherically-seated stype provided with forced oil lubrication from an oil pump belt-driven from the main shaft, the oil being passed through an external oil cooler.

The double thrust bearing, of the Michell type designed to deal with a thrust of 24 tons, is cooled by means of the circulation of oil from the same pump which can be seen in Fig. 8. In each bearing is provided a dial type thermometer with contacts to operate an alarm should the temperature exceed a predetermined value.

An overspeed device of the centrifugal type is incorporated in the turbine governor gear drive, the fixed portion being carried from the gear case and the moving portion on an extension of the governor shaft.

The direct-coupled main and pilot exciter armatures are mounted upon the same shaft, the latter exciter being of the overhung type.

Owing to the extensive overhead transmission system ultimately to be supplied, it was necessary for the alternators to be designed to have quick response excitation which, operating in conjunction with automatic voltage regulators, enables the voltage over the whole network to rise with increase of load. The machines are, therefore, designed for stable operation from the limits of 3,000 kva. zero leading power factor 9,800-volts up to a maximum of 3,200 kw. at 0.85 lagging power factor 12,100-volts. Between the limits of no load and full load the increase in the alternator terminal voltage is 10 per cent, i.e., from 11,000-volts at no load up to 12,100-volts at full load. Furthermore, the range of operating terminal voltage can also be lowered to 9,800-volts at 3,000 kva. zero power factor leading, rising to 10,780-volts at full load.

The ceiling voltage is such that the rate of exciter response in volts per second is twice the numerical value of the excitation voltage corresponding to 3,200 kw. (i.e., full load) 0.85 power factor, a current limiting resistance being automatically inserted to limit the steady field current to twice full load value.

Automatic Features

A number of automatic devices are provided with the plant.

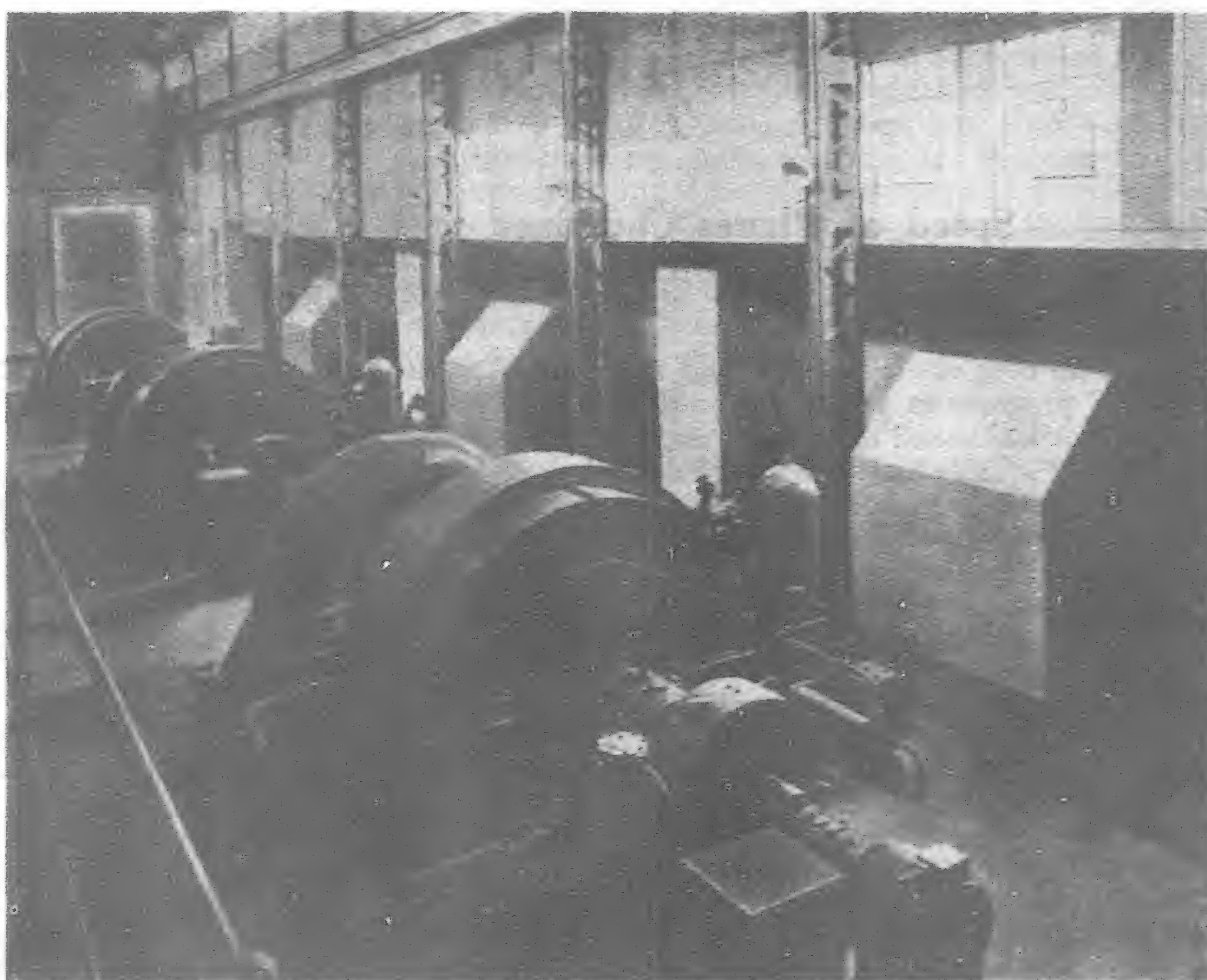


Fig. 8.—Three 4,750 h.p. Sets in Power Station viewed from generator ends

The butterfly valves at the forebay are fitted with an electrically-operated trip; the cylindrical balanced valves can be opened and closed electrically, and the turbines can be shut down electrically by means of a solenoid on the governor. The automatic features are interconnected and controlled through limit switches and tripping devices for a comprehensive control scheme which is now a common feature of the Company's turbines and associated hydraulic plant.

The erection of the plant proceeded smoothly considering the difficulties which were bound to be encountered in a region so remote. As stated at the commencement of this article the scheme was formally inaugurated on April 23, 1938, and according to reports received from India the plant is operating satisfactorily on the load at present available.

Maintenance of Depths Alongside Wharves and Piers by Dredging

(Continued from page 143)

writer has not heard of this having been used. Welding is now extensively used for dredger repairs. The very best lubricants and ropes should be used.

Private and Public Dredging Service

The writer's experience has principally been with dredging carried out by a public authority at fixed rates, which are somewhat below actual cost because of the indirect benefit to the harbor caused by riparian dredging, but there are several aspects of the question of public versus private dredging contractors. The public authority often has the advantage of possessing a large and varied plant, much better facilities for mud disposal, and may reasonably expect an average demand which will equalize costs and distribute overheads. On the other hand, unless the officials are really public spirited, acquainted with business and have been given considerable discretionary powers, private wharf owners may be treated arbitrarily and suffer losses which they might avoid in dealing with a private contractor.

The latter, on the other hand, unless he is in a very big way of business, has a limited plant of limited applicability, may find difficulty in securing mud disposal sites, and often has to bring his plant great distances to and from the job. Speaking generally, and quite apart from large contracts for new works, the dredging contractor is not very well placed to do ordinary riparian dredging, and in those cases where he is in competition with public authorities he is not usually able to offer such good terms or to do the job so

well. There must, however, be many exceptions to this rather broad statement.

Special Cases

In special cases where, say, deepening in hard material is combined with the removal of accretion, rock breakers may be required. Blasting near wharves is rarely expedient. In some localities high-pressure jets, applied close to a mud surface will allow the material to be washed into deeper water. A plant for this purpose should be so designed that the kinetic energy of the jets is not much less than 50 per cent of the horse power of the motors operating the pump, and the nozzles must be controllable so that they can touch the material to be removed. Even a few inches of space between the nozzle and the material causes practically all the momentum and energy of the jet to be transferred to the surrounding water. As for playing on the mud like a fire hose from some distance, this is practically useless. With close jetting on alluvial material an output of perhaps 1 cu. yd. per horse power hour is possible. This will be shifted to a distance depending on the fineness of the material and the local currents. In some cases two or three shifts may be necessary to get the material into sufficiently deep water. With suitably designed apparatus, this method is a good one for removal of accretion from under a wharf deck out to the front where it may be dredged in the ordinary way. The jet pipes must be clamped to something firm, as the reaction of a jet sufficient to produce useful erosion is too great for a man to be able to hold the pipe.

Air Travel Progress

Speed of Planes Combined with Factors of Mechanical Reliability and Comfort

By ROBERT BRENARD

THE eyes of air folk are, just now, turned upon impending progress on two of the world's great oceans—the North Atlantic and the Pacific.

Take first that vital air trade route across the North Atlantic, which is to link up the existing Empire airways with the flying system of Canada and the United States. Four big new Imperial flying-boats—"Cabot," "Caribou," "Connemara" and "Clyde"—are now being made ready for operation this summer, of the first regular commercial air route on this ocean airline; while expert crews for these long-range aircraft, chosen from among the skilled personnel of the Empire flying-boat services are now undergoing a special course of training at the Southampton air-base of Imperial Airways. And while these preparations are in hand with aircraft and the personnel to handle them, finishing touches are also being put to the wireless and weather reporting systems.

The control of the wireless and weather organization of the Atlantic flights will be centers at the special air-station which the Eire authorities have established at Foynes on the west coast of Ireland at the mouth of the river Shannon. To this ocean air-port will flow wireless messages from shore-stations on both sides of the Atlantic, and also from ships out at various points on the ocean route. And it is these messages, describing weather conditions prevailing at the moment, which will enable experts at Foynes to prepare special maps indicating the general meteorological conditions right across the 2,000 miles of ocean between Ireland and Newfoundland. These maps will deal not only with surface conditions but, as a result of special upper-air observations made with small pilotless balloons, an indication will also be given of the direction and strength of winds at the heights at which ocean-aircraft will be flying.

Before starting their non-stop ocean voyages, flying-boat captains will study these weather maps and, as a result of the general meteorological position revealed by them, will plot out courses enabling them to avoid bad-weather areas and, wherever possible, to take advantage of the assistance of any favoring winds.

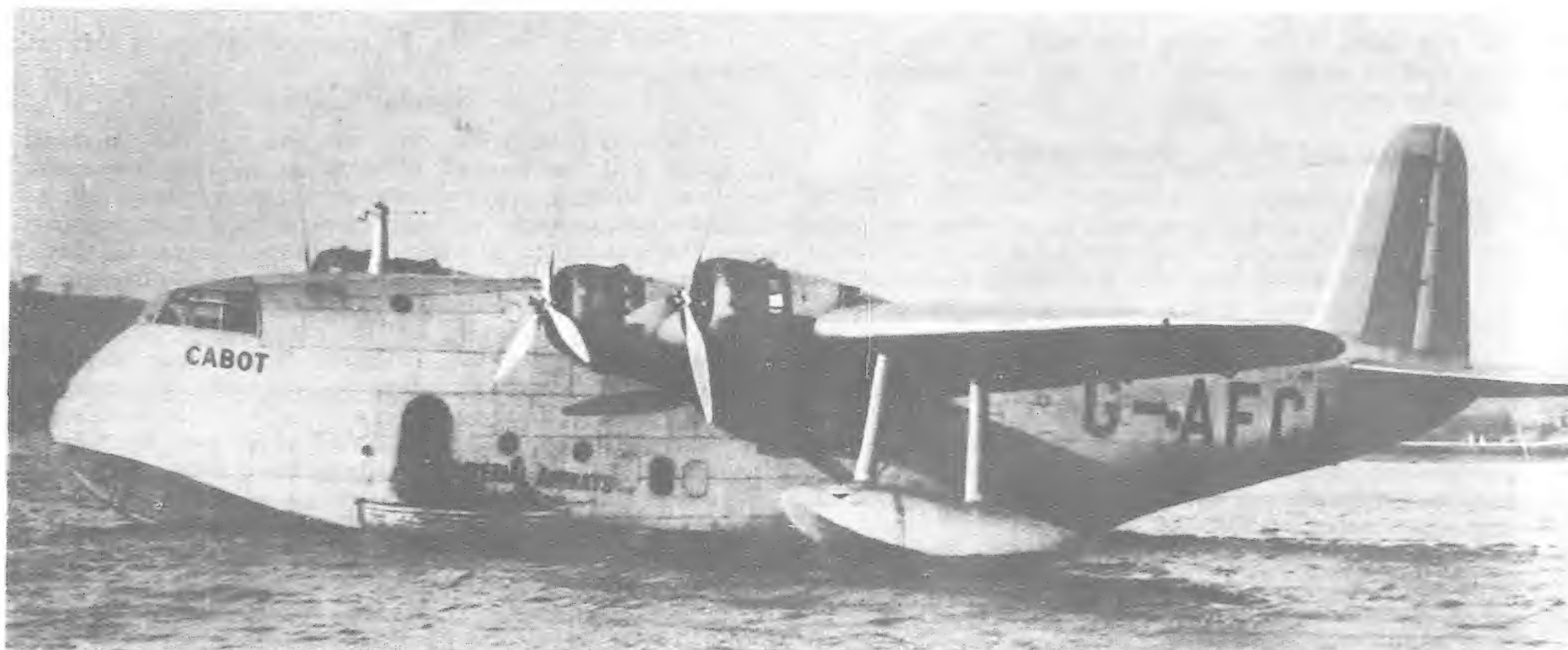
Apart from the four Imperial flying-boats which, as already mentioned, have been allocated specially to the Atlantic, there are four other big new flying-boats of the same type; all these eight aircraft being of a strengthened type enabling them to operate

at bigger "all-up" weight figures than the fleet of Empire flying-boats now in use on the routes between England, Africa, Malaya and Australia. Whereas, for example, units of the existing Empire fleet have an all-up weight figure of 40,500 lbs. the new boats can operate at a weight-figure of 46,000 lbs. Nor is this all. Because certain of these new long-range flying-boats are fitted with equipment enabling them to be fuelled from special tank planes while they are aloft; and when they have taken aboard a load of petrol in mid-air they can operate at a weight figure of 53,000 lbs.

This method of aerial fuelling and also the other system—represented by the Short-Mayo composite aircraft—in which a machine is launched in mid-air from the wing of a big mother-craft are being tested under practical conditions with a view to increasing the range and load-carrying capacity of commercial aircraft when engaged on long, non-stop flights.

Three of the flying-boats of the new strengthened type are to be employed on the airline to be opened up, shortly, between Sydney (Australia) and Auckland (New Zealand). The names of these three trans-Tasman boats are "Australia," "Awarua" and "Aotearoa"; while the remaining flying-boat of the new type, "Champion" is to be sent out by Imperial Airways to operate on the Company's marine air route between Bermuda and New York.

Apart from the importance of the new North Atlantic flying-boat service, great significance is now attached to forthcoming air progress in the Pacific. Discussing this question, the other day, was Mr. Hudson Fysh, Managing Director of Qantas Empire Airways, the Australian associate company of Imperial Airways which has the task of operating the Singapore-Sydney sections of the England-Australia air route. Mr. Hudson Fysh has been in England recently, and it was prior to his return by air to Australia that he talked about the coming importance of aviation in Pacific zones, mentioning particularly the friendly arrangement which has been arrived at, between Britain and America, as to the ownership, and use as bases for flying-boats, of certain of the Pacific islands. Mr. Hudson Fysh added that special surveys and investigations are now in hand with a view, in due course, to extending the Australia-New Zealand flying-boat route from New Zealand across the Pacific to Fiji; while after this the idea would be to continue the route over the Pacific to San Francisco and on to Vancouver.



Four long-range flying-boats of the "Cabot" type, here pictured, lead the fleet of aircraft provided at the Imperial Airways for the newly inaugurated Trans-Atlantic service. These are similar to the standard flying boats seen along Empire routes to South Africa, the Far East and Australia

It may be mentioned that at Vancouver there is to be a big new air-port combining facilities for both flying-boats and land-'planes; and it would be here—at Vancouver—that the Pacific flying-boats would effect a regular connection with the express land-planes operating on the trans-Canada air-mail across to Montreal.

At Montreal the trans-Canada land-planes would establish a connection with the big flying-boats of the service operating across the North Atlantic to Ireland and England; and the establishment of these new routes, together with the existing England-Australia service—would enable Imperial air transport to realize the long-cherished ambition of operating a great series of inter-connected air-lines completely round the world.

It was to facilitate air transport developments in the Pacific—and more particularly in the south and south-west Pacific—that an important conference of meteorological experts was held in New Zealand, and it may be remembered that they made a number of expert recommendations, among these being a plan for a special study, from an aviation point of view, of the movement of typhoons in Pacific zones. They also suggested the establishment, on a number of Pacific islands, of special meteorological stations for obtaining information as to weather conditions both at ground-level and in the upper air. These stations would flash regular reports by wireless to central receiving points. Arrangements would also be made for ships operating in the Pacific to send in wireless weather news.

In this way air captains on the Pacific—as well as those on the Atlantic—would be able to obtain, before starting any long-distance air voyage, an accurate idea of the weather conditions lying ahead of them along their routes.

Years ago air pioneers were setting out on perilous ocean crossings in small single-engined machines; which meant that, if any mechanical trouble developed while in flight, there was nothing for it but an immediate descent into the ocean; a predicament rendered all the more serious owing to the fact that they had no wireless apparatus in their machines by which to summon aid.

To-day ocean air crossings are made by giant multi-engined aircraft having ample reserves both of power and speed; while these machines of to-day are also in constant touch by wireless with ships and shore-stations. And what all these modern improvements mean—both as regards aircraft and equipment—is that what was a great adventure years ago can, to-day, be converted into a normal routine operation, carried out to schedule under definitely commercial conditions.

Although there are many divergent views as to the scope of flying in the general scheme of transport, everyone is agreed that the essence of air travel is the sheer speed which it provides. And, this being so, any fresh development in this vital question of speed, is naturally a matter of interest; a fact which renders specially significant the achievement, the other day, of the new Imperial express-plane "Falcon."

After taking aboard 11 passengers and a ton of mails and freight at the London air-port, Croydon, this four-motored air-liner succeeded in flying the 200 miles to Brussels in 48 minutes, averaging throughout a speed of 250 miles an hour, and beating the previous speed-record on the London-Brussels route by five minutes. And on another recent occasion this same air-liner, "Falcon," carrying a ton of mails, flew the 641 miles from London to Marseilles, non-stop, at a speed of 222 miles an hour.

It is this year of 1939 which will see British civil aviation entering upon its twenty-first year. At just about this time of

the year, away back in 1919, the British Government was making its final preparations for the establishment of an Aviation Department in the British Air Ministry—a department to deal solely with the development of flying in its commercial and private aspects. Actually, it was in February, 1919, that this new Department came officially into existence, and a few months later saw British enterprise initiating the world's first daily air express for passengers and freight between London and Paris.

It is interesting to recall that to provide the flying stock for that first airway what was done was to convert a certain number of war-type biplanes into passenger-carrying craft. Those 360 h.p. 'planes were fitted with small cabins carrying a couple of passengers and, so equipped, they flew on the Paris route at a speed of about 80 miles an hour. Pioneer passengers who flew in them had to endure a tremendous din from the engine, while their quarters were so cramped that they had to sit just where they were, without moving, until their flight between the two capitals had been completed.

Compare those conditions of just twenty years ago with the air speed and luxury of to-day, and you have a striking picture of what British aviation has been able to achieve in the pioneer years between 1919 and 1939.

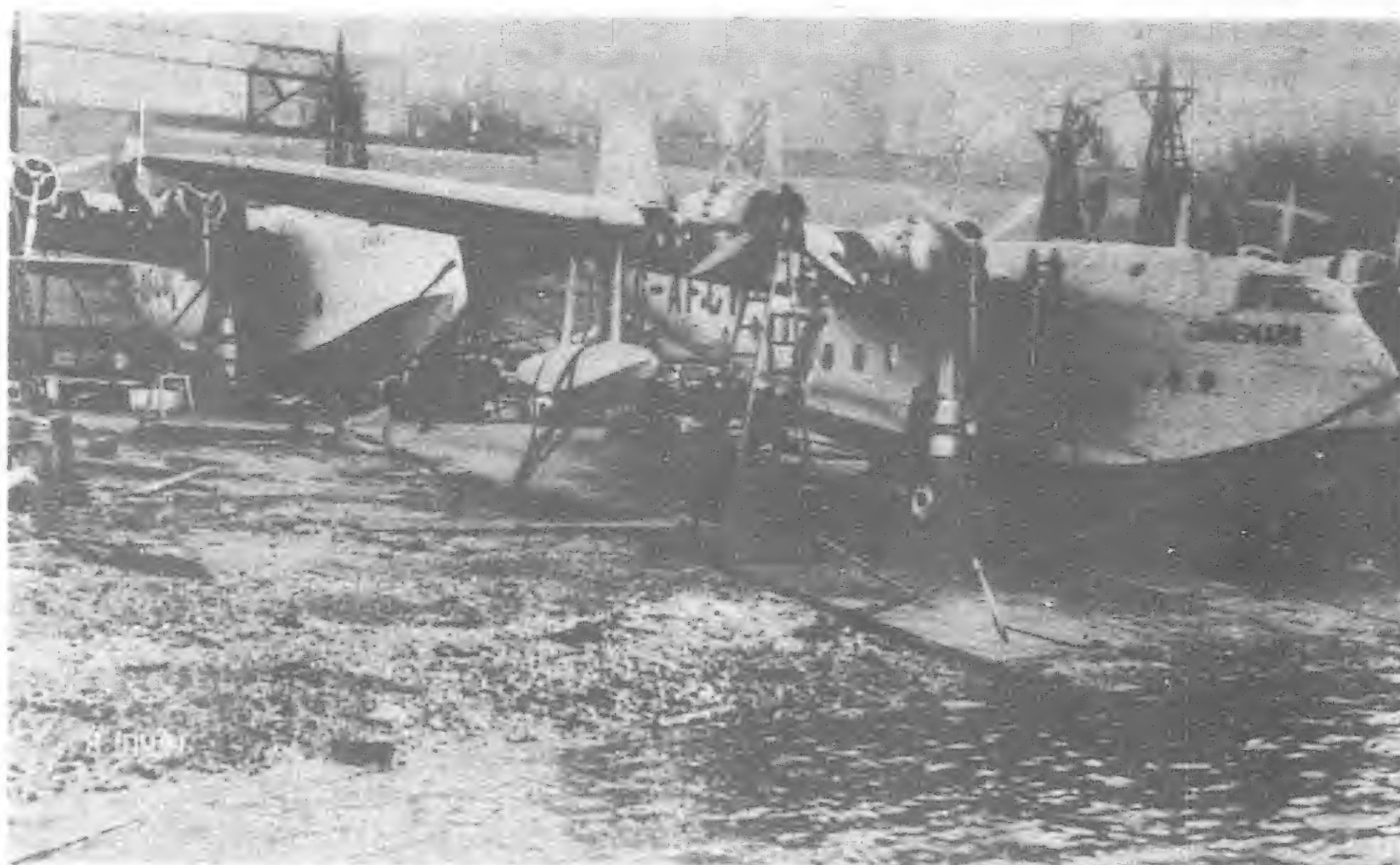
It was after "Falcon" had beaten the London-Brussels record the other day that a group of experts, discussing at the London air-port

the progress achieved with British commercial aircraft, found themselves examining all those aspects of technical progress which have increased so enormously the speed, reliability and comfort of our passenger-carrying land-planes and flying-boats. They agreed, of course, that scientific "stream-lining" has played a vital part in such progress—the elimination in aircraft of resistance-creating external wires, and of projections setting up wind-resistance, and the general smoothing and stream-lining of the whole structure until one gets slim, tapering, graceful-looking craft such as the new express-planes of Imperial Airways.

And then of course there is the vital question of the power-plant—of the engines driving the aircraft. These have been improved in countless ways. They have been made more reliable and, at the same time, they have been made to give their power for lower weight factors; while the actual efficiency of the power obtained has been increased by the employment of variable-pitch air-screws; which confer on an aircraft something of the gear-changing advantages of the motor-car.

One specially important aspect of British commercial air policy has been the decision to concentrate upon big air-liners of the multi-engined type. From the first it has, in fact, been recognized that speed alone is not enough; it is essential that commercial air speed shall be associated, under all operating conditions, with the highest factors of mechanical reliability. Hence the evolution of the giant four-motored air-liner. In early days, when single-engined craft were being employed, should any mechanical trouble develop while in flight, a pilot had no alternative as a rule, but to make an immediate forced landing, often in conditions of difficulty or danger. To-day, in contrast to that, one of our big multi-engined air-liners can, even when fully-loaded, take off and climb on the power of any three of its four engines, and, when once aloft, can maintain height and continue on its course with only two of its engines working; which implies, under ordinary operating conditions, a virtual elimination of any risk of a forced-landing

(Continued on page 155)



A recent photograph showing two Imperial Airways super-stressed flying boats being put into the Trans-Atlantic service. On the slipway at Hythe, the "Connemara" and "Cabot" are here seen undergoing engine adjustment prior to their trials

Tokyo's Planetarium is Newest and Most Spectacular Feature

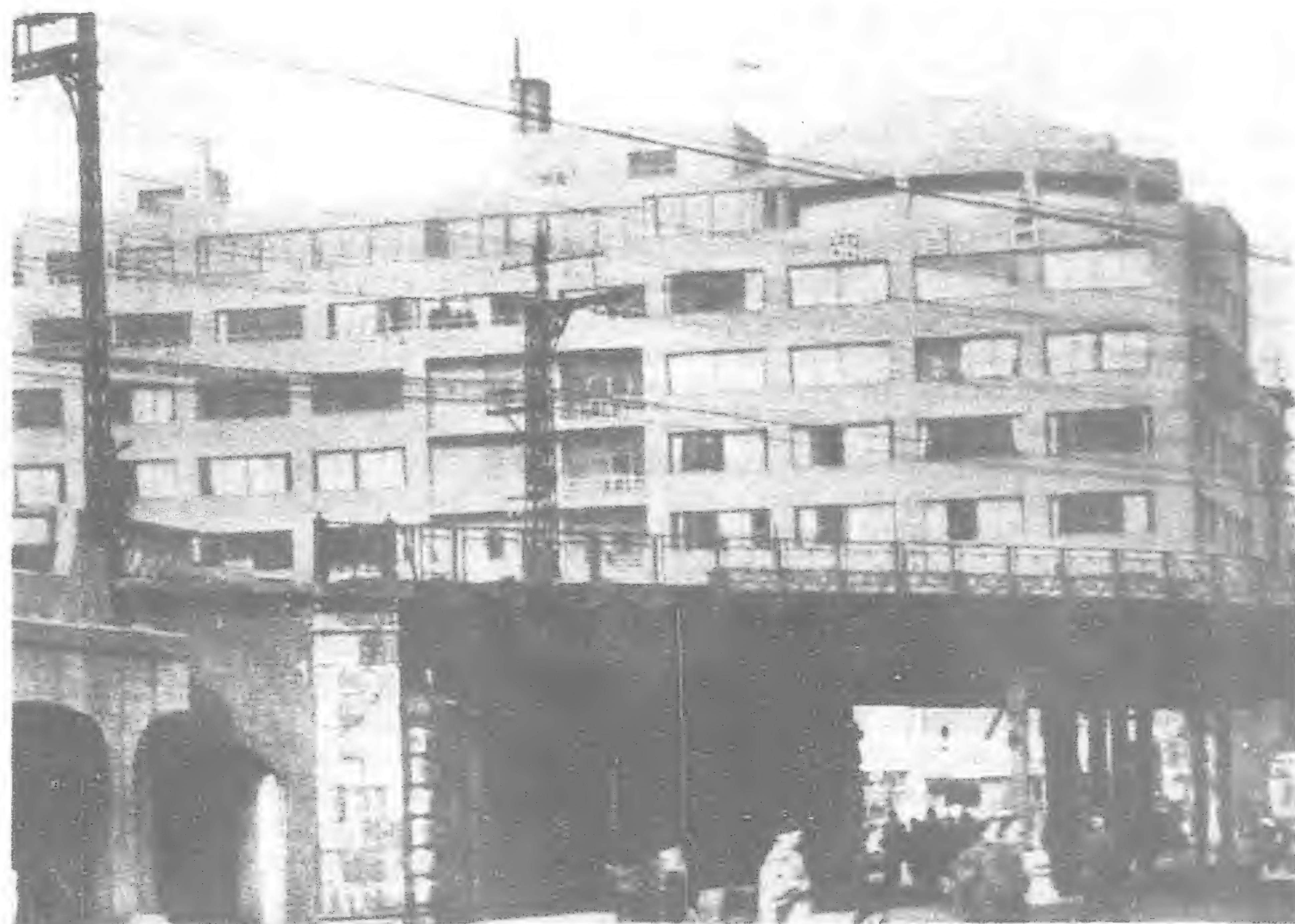
By FELICIA GRESSITT

IF one rides through Tokyo on the "L," one passes at Yurakutyo Station in the heart of the city an imposing new building of eight stories with a large dome on the top of the six story part. The pale color of the building, its ultramodern structure, and its fresh newness are indeed all arresting, but the choicest secret of it is that it harbors one of Tokyo's newest and most spectacular attractions—the *Nichi Nichi* Shimbun's Planetarium, just completed and opened last November.

Finished in the early part of the month, Tokyo's planetarium has as fine an instrument as the planetaria of Berlin, Philadelphia, New York, or Chicago. In fact, it has one feature which surpasses these, and even the newly-finished Griffith Observatory at Los Angeles,—namely, that the seats in the lecture hall are most fitly supplied with springs which enable the star-gazer to lean back comfortably and survey the heavens as they are being interpreted for him, without developing the proverbial stiff-neck that comes from too much celestial scrutiny! The Tokyo planetarium is by no means the first one erected in Japan, for the planetarium at Osaka has been in operation for several years.

On entering the building, which is called the *Tonichi Tenmon Kaikan*, or "The Tokyo *Nichi Nichi*'s Hall of Astronomy," one purchases a fifty sen ticket and takes the elevator to the sixth floor, where one alights to the reception room. To the right is the exhibition hall, and to the left the planetarium hall, where lectures are given throughout the day, at 11.00 a.m., 1.00 p.m., 2.30, 4.00, 6.00, and 7.30. The floor opens at 9.30 in the morning.

Let us go first to the dome room. It is of course different from any other in that it is Tokyo's skyline, which is depicted on the horizon around us. Nestling down in the deep comfortable chairs, to the sound of recorded music, we watch the light or day—effected by very clever indirect lighting—slowly fade, and the sun



Beyond the elevated railway, stands the Tonichi Kaikan which houses the Planetarium; the dome may be seen on the roof top

in our miniature celestial hemisphere gradually sink to west over Tokyo. The lecturer now commences by giving the listeners a tour of their horizon, pointing out with his flashlight arrow the various outstanding buildings and distinctive markers on Tokyo's fascinating skyline. Then as the sky grows still darker, the brilliant stars and disc-like planets appear overhead, projected from the great instrument in the center of the room. The instrument is a large mechanism, highly complex, and shaped somewhat like a dumbbell, with spheres at either end having the same longitudinal axis. A horizontal axis; on which the whole may be tilted, runs through the mechanism at the center. Each large sphere is equipped to project upon the dome overhead all the stars visible to the naked eye in one celestial hemisphere, and rotates (on the longitudinal axis) to reproduce the apparent motions of the stars as seen from our earth. The parts of the mechanism between the two spheres project beams which represent the sun, the moon in its various phases, the naked-eye planets, as well as graphic reproductions of the configurations applied to constellations, and the ecliptic, the celestial equator, the meridian, and certain celestial phenomena, such as the great nebula in Andromeda, and so on. It is interesting to note that the sun, though it is an exceedingly dim one, is produced by the focusing of four adjacent beams of light upon a single spot, to give it some intensity of light.

For the major part of the lecture, the northern sphere of the instrument is projected upon the sky over head, and the axis upon which it rotates fixed at the angle of 37 degrees, in order to reproduce exactly the heavens as seen from Tokyo's 37° north latitude.

As we watch enrapt the pageantry of stars and planets throughout the different seasons, we listen to the account of these and other celestial phenomena; the moon's course around the earth, the apparent yearly path of the sun along the ecliptic, meteor showers, comets, and the like. And before all is finished, we experience the rare privilege of seeing skies which are unknown to those of us who live north of



The pageantry of stars and planets as shown may be enjoyed in Tokyo's "Nichi Nichi's" Planetarium

the equator. For, as the hitherto lower portion of the instrument is slowly raised, the stars of the northern hemisphere disappear to the northward, and the southern sphere projects for us the southern skies in all of their glory. There now come to our view the Magellanic Clouds—those inconceivably immense island universes so far, far beyond the mighty galaxy of which we are such an infinitesimal speck. There comes the famed "Southern Cross" and other south circum-polar constellations, while by day, we see the sun rising and setting in the "sunny north."

When one recovers from being lost in the wonder and splendor of the starry heavens, and the overwhelming awe of the tremendous figures with which its distances and motions must be described, one emerges to daylight, and the exhibition room.

The exhibition hall of the *Nichi Nichi* planetarium is interesting and instructive, with some utterly unique features, not duplicated elsewhere on this terrestrial sphere. Here we find an excellent historical exhibit of the progress of astronomy in Japan. In addition to the number of quaint ancient Chinese star maps, and diagrams of the solar system, and so on, there are, to the right as one enters, several cases containing the most unusual relics from pre-Meiji times in Japan. Among other things, there are two telescopes, discs, and sets of implements used for grinding lenses. There are old star maps, prints, drawings—one of which was a chart of the sun showing sunspots observed at 5 o'clock, on August 8, in the 7th year of *Tenpo* (1837). Besides these and other records, we see a collection of the old Dutch texts on astronomy which first came, being smuggled surreptitiously into Japan when the study of sciences was yet forbidden. They date to early nineteenth century, one as far back as 1829.

In another part of the room are displayed an accurately constructed set of the nine planets, each rotating, by means of a motor underneath, on its proper axis (The rotation of Uranus—instead of being on an axis nearly perpendicular to the plane of revolution around the sun, as is the case with the other planets, is on one almost paralld to it—will certainly intrigue you!) Though these models are constructed to scale as regards size, no attempt is made in Tokyo's limited space to reproduce the relative

distances of these bodies from the sun, nor yet to represent the motions of the satellites, or the varying velocities of Saturn's many rings.

Another part of the exhibit has eight small models of portions of the heavens—the evening skies of the four different seasons, looking north, and south, respectively from Tokyo. Little buttons, labelled with names of distinctive celestial objects may be pressed to point these out with a light from behind. All these and other items of the exhibition are serving to aid countless people and school-children in the nation's capital to attain an amateur knowledge of astronomy which will surely enrich their lives; as also it testifies to Japan's rapid progress in the fields of science.

Especially informing are the interesting lectures all in Japanese, of course,—whose varied subjects are listed below; one for each month, commencing with November, 1938, the opening month:

November, 1938: What relation has the Milky Way to the structure of the Universe?

What is our location in the Universe?

December: Past skies and future skies. How did the stars look at the time of Zinmu Tenno's conquest (allegedly, 660 B.C.)? How will they look 10,000 years hence?

January, 1939: Origin and destination of the sun. Its evolution. Its destiny.

February: Different varieties of stars. Variable stars and double stars. Who is to solve the riddle of the variable stars?

March: Habited and uninhabited stars (i.e. planets; the word is used for both). How many and which can sustain life?

April: The south circum-polar heavens, and north circum-polar heavens. Main features of the two. Would you not like the experience of seeing the midnight sun?

May: The true character of the sun; the parent of all life. The nature of this celestial body which is the source of life and nourishment.

June: Time and the calendar. Measurement of time, and construction of our calendar.

Air Travel Progress

(Continued from page 153)

through mechanical trouble. It is this modern mechanical dependability, combined of course with the advantages of highly-organized ground equipment, which now enables the air-liners of Imperial Airways, and of its subsidiary and associated companies, to operate in all sorts of climatic conditions with a reliability of just on 100 per cent.

Of outstanding importance though they are, the qualities of speed and of reliability are not in themselves sufficient to ensure the commercial success of any modern air-line. What is equally essential is the provision of the highest factors of personal comfort for passengers using any such air-line. Hence the ceaseless work of many experts to ensure the silence of the modern air-saloon; to provide it with efficient heating, lighting and ventilating systems; to equip it with luxurious armchair seats; and to arrange for an aerial catering service which is as efficient as anything in this direction to be found in first-class restaurants or hotels. Such success has been achieved in these matters that modern air transport now offers not only the swiftest method of voyaging from point to point, but also in many respects the most luxurious.

In addition to all such strides affecting speed, reliability, and comfort, there has of course been wonderful technical progress in the handling and navigation of commercial aircraft. Pioneer aeroplane pilots, flying in days before the Great War, had only a couple of instruments on their dashboards—an engine revolution indicator and a primitive type of air-speed indicator. To-day, however, the modern air-liner captain, with his first-officer sitting beside him, has a wonderful array of dials, gauges and levers in his control-cabin.

There are instruments such as the sensitive altimeter and air-speed indicator. There are all the dials connected with the operation of four powerful engines. There is the recording apparatus of the "blind-approach" wireless equipment. And there is all the operating mechanism connected with the retractable under-

carriages, wheel-brakes, and wing-flaps, while whenever he desires to do so the captain can now switch on his automatic piloting apparatus—a gyroscopically-controlled device which will take over the flying of a machine just as efficiently as though human hands were at the controls, leaving the captain and his first-officer free, for the time being, to focus their attention upon any problem which may have arisen in connection with the navigation of their machine.

Electric Machinery Plays Important part in Japan's Industries

(Continued from page 145)

Many outstanding reactors were manufactured and among them are suppressing reactor for the Manshu Dengyo Kaisha (Manchuria Electric Engineering Company, Ltd.) of 22,800 kva—154 kv—256—103 A was the highest capacity reactor made in the world. There are also under construction a number of reactors including two of 25,000 kva and 20,000 kva capacity for the Manshu Dengyo Kaisha, one of 6,975 kva for the Toho Electric Power Company, and another of 5,300 kva for the Chosen Government office.

Besides the foregoing the following products by the Shibaura Engineering Works which are creating high reputation among users both in Japan and abroad are; induction motors, special generators, frequency converters transformers for electric furnace, special transformers, induction voltage regulators, condensers, switchboards, switches, air breakers, oil circuit breakers, relays, controllers, electrical installations for cranes, electric locomotives, electric motors and controllers, induction furnaces, resistance furnaces, welding machines, and many other equipments and parts thereof.

New Demag Ship Hoist

By K. BÖTTCHER, Obering. I. R. VDI, Duisburg

LOCKS or ship hoists are built to overcome differences of level in waterways. When the differences of level are slight, use has been made hitherto mostly of locks, whilst, in isolated cases, ship hoists have been built when the differences of level have been very great.

In waterways, in which it is necessary to practise economy in regard to the consumption of the water, ship hoists are very advantageous, inasmuch as the water required to operate them is not worth mentioning. It is even possible with them, by individual lifts of the trough, to equalize the displacement of the water that otherwise occurs from the upper level to the lower level or *vice versa* due to the different nature of the traffic on the waterway (mostly downstream or mostly upstream).

For this reason the passage of a convoy of ships through a ship hoist is generally much cheaper than through a lock and also much quicker, with the result that the waterway gains in efficiency.

Great differences of level can be overcome in hoists in one lift. For instance, the ship hoist at Niederfinow, on the Hohenzollern and Finow Canal, in the neighborhood of Berlin, which was put into commission in the Spring of 1934, has a lift of about 36 m, whilst the lock plant in its vicinity overcomes the same difference of level with four water storage locks, each with a lift of 9 m and lying one behind the other.

The ship hoist Henrichenburg on the Dortmund-Ems Canal opened in the 'nineties was built only for ships of 700 tons burden, while the new ship hoists, like the one at Niederfinow and the more recent ones at Rothensee and Hohenwarthe near Magdeburg are arranged to accommodate ships of 1,000 tons burden.

A ship hoist for vessels of 1,500 tons burden is being planned at present.

At the ship hoist Niederfinow the weight of the trough, which hoists the ships, is balanced by counterweights hanging from ropes that run over sheaves, whereas, at the hoists at Henrichenburg, Rothensee and Hohenwarthe the weight is balanced by floats. The trough of the older hoist at Henrichenburg is carried by five floats, whereas, at the more recent hoists near Magdeburg, there are only two floats for each hoist, in order to obtain a statically determined system. These two floats are naturally larger than the five former ones, all the more so, as the more recent hoists have to lift larger vessels. The floats of the 1,000-ton ship hoist at Rothensee have a diameter of 10 m and are 32 m in height. If a hoist of this kind were to be built for vessels of 1,500 tons burden, one would require, according to the investigations made, two floats of roughly 45 m in height and 10 m in diameter.

With a view to designing the construction of the trough and the pit of the trough appropriately, the water level in the shafts of the floats of such a hoist would have to be about 8 m below the water level of the lower level at low water. There should be at least 1 m of water above and below the float in its extreme positions.

If a lift of 20 m be assumed for such a hoist, this gives a depth of the float shaft for the hoist, measured from the lowest water level of the lower level, of

$$8 + 1 + 45 + 20 + 1 = 75 \text{ m.}$$

The construction of float shafts of such a depth entails a very heavy expenditure and in the majority of cases it is not possible beforehand to make even a rough estimate of the costs.

For example, the float shafts for the ship hoist Rothensee turned out to be much dearer than estimated, which was due to the unfavorable conditions of the soil encountered. Naturally, the diameter of the floats can be made larger with a view to reducing the depth of the float shaft. The diameter of the floats is limited, however, on the one hand, by the width of the trough, and, on the other hand, this measure would not lead to any great reduction in the costs of the construction of the float shafts.

The time taken to build the float hoists constructed up till now is comparatively long, as the construction of the trough compartments cannot be commenced until after the float shafts have been sunk, and it is only then that the erection of the high floats on the site can be started.

It must be looked upon as a drawback that, both in the case of hoists with counterweight balance and in the float hoists built up till now, special safety devices had to be provided for a case of dire emergency (the trough running empty) and which have to absorb enormous forces to prevent the trough going up unintentionally through the buoyancy of the counterweights or floats that is released. If, for example, there were suddenly to be a leak of about 1 sq. m in size in the bottom of the trough, then, with a water level of 3 m in the trough, about 200 cu. m of water would run out per minute. The trough containing 3,200 tons of water would then be empty in 16 minutes and the safety device would have to absorb the buoyancy released of 3,200 tons. Safety devices of this kind for such enormous forces are, however, very costly installations and it is therefore a great advantage when, as will be shown later, these expensive installations can be dispensed with, more especially because, as experience shows, forces of about 120 tons at the outside must be reckoned on for the actual lift.

In contrast to the ship hoist described, a new hoist developed by Demag, Figs. 1, 2 and 3, embodies great advantages particularly in regard to lower building costs and shorter building periods. Demag proposes to employ instead of two cylindrical, upright floats, Fig. 4, just one flat float that is protected by the German Patent No. 657005.

A lift of 20 m is foreseen for the two hoists shown on a like scale in Figs. 2 and 4.

The float under the new proposal is rectangular when viewed in plan and approximately as long as the trough for accommodating the vessels. Its width is a little less than the clear width of the trough and its height about 7 m. In the new hoist the depth of

the float shaft can therefore be very much less than in the constructions hitherto customary. At a lift of 20 m it amounts to just:

$$1 + 7 + 20 + 1 = 29 \text{ m.}$$

As the construction of the trough can also be designed more favorably, the depth of the trough compartment can likewise be somewhat less. The trough compartment will have a depth of only 5 m, as against 8 m in the hoist with vertical, cylindrical floats,

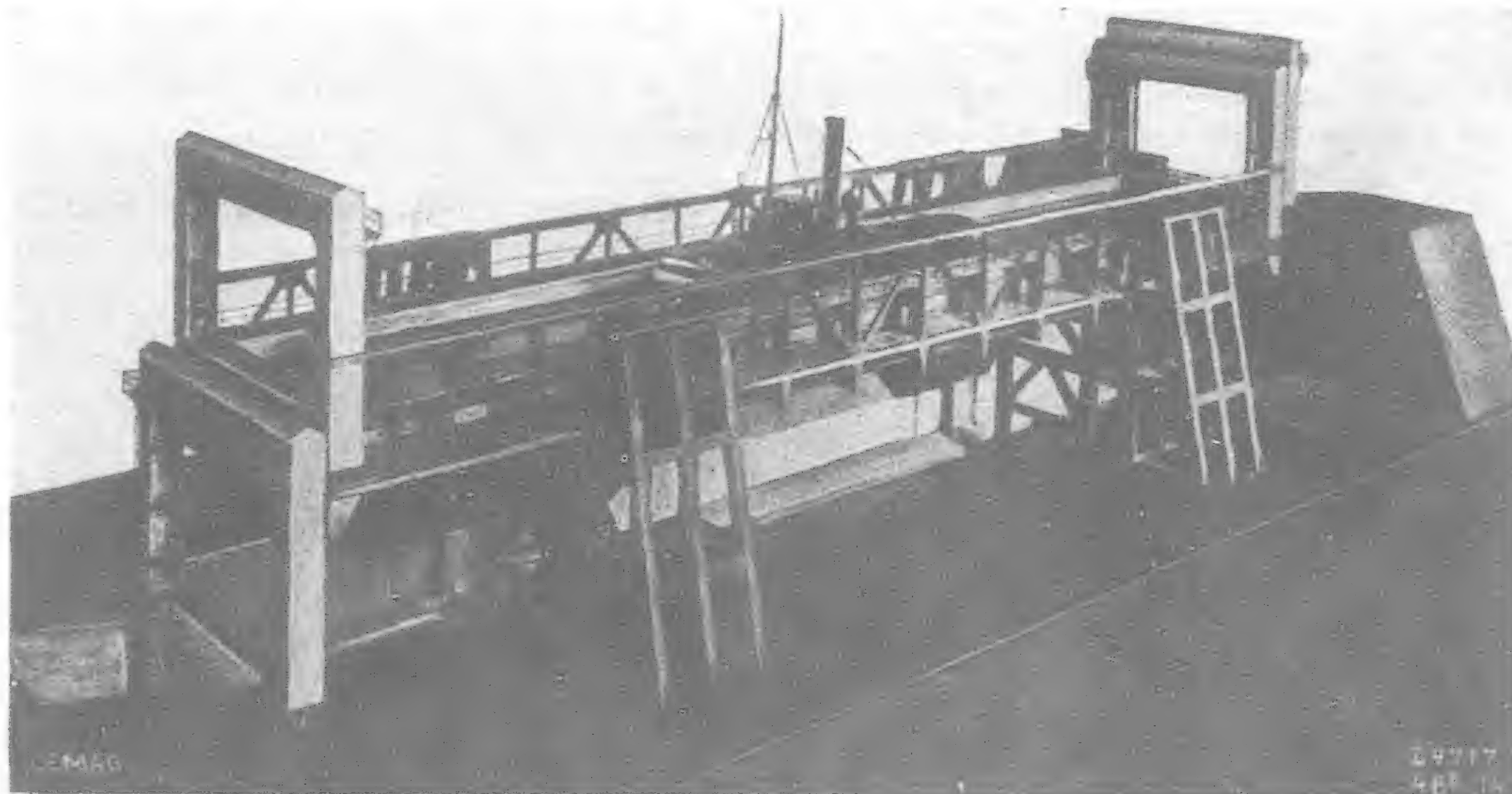


Fig. 1.—Model (1 : 50) of the Demag ship hoist with a flat float (German patent) for ships of 1,500 tons burden and a lift of 15 m.

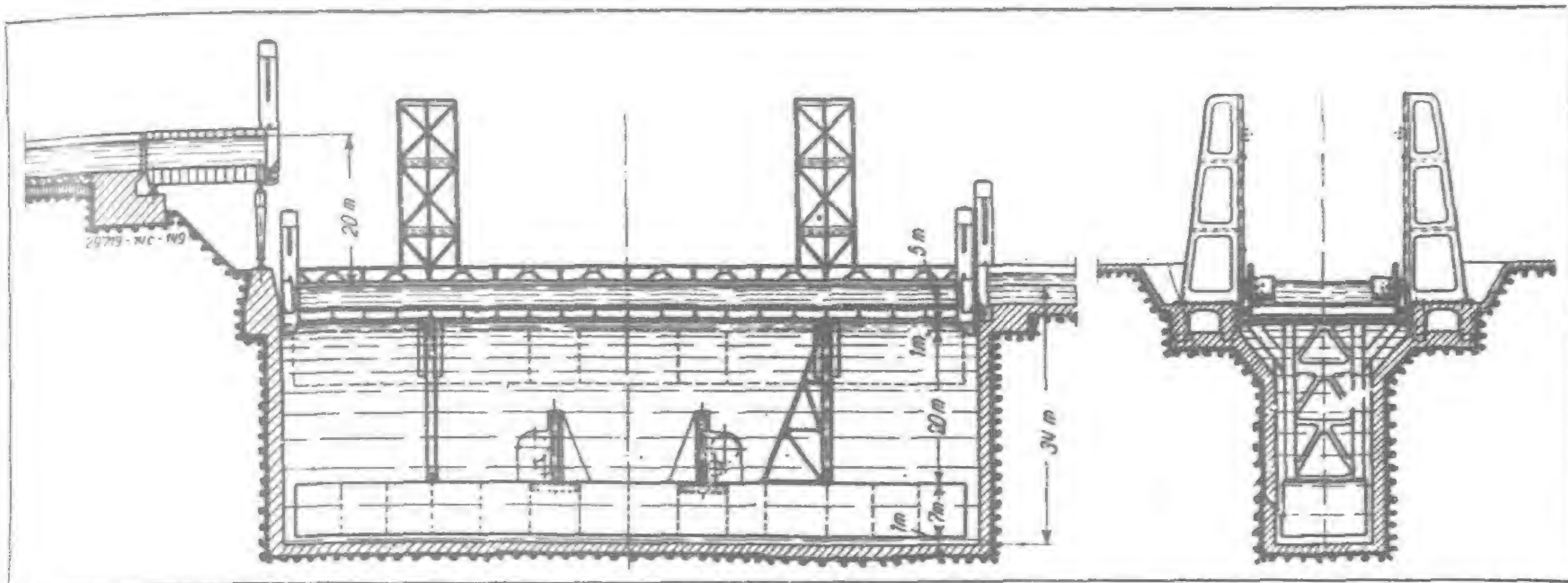


Fig. 2.—Demag ship hoist with flat float (German patent) for ships of 1,500 tons burden and a lift of 20 m.

measured from the lowest water level of the lower levels. Actually there is no special trough compartment at all in the new hoist, as the upper part of the float shaft supports the trough in its lowest position. This means a considerable saving in brickwork. In the new construction, the bottom edge of the float shaft is just

$$29 + 5 = 34 \text{ m}$$

below the lowest water level of the lower level.

A distinct advantage of the float is that, in the event of the trough running empty, the flat, on account of its width, just rises gradually in keeping with the rate at which the water is being discharged and finally emerges from the water. When the trough is absolutely empty, the float does not emerge more than about 3.5 m.

As the surface of the float, when the trough is full, should in its normal top position be 1 m below the water level of the float shaft, the trough rises only

$$1 + 3.5 = 4.5 \text{ m}$$

above its normal top position after the trough is entirely empty, so that all that is necessary for the so-called case of dire emergency (the trough running empty) is to make the guide framework for the trough 4.5 m longer. In a hoist with vertical, cylindrical floats, the guides would have to be made 22.5 m longer for like conditions. In the new hoist there is no need to have a special safety device to absorb the enormous forces otherwise released in the case of such a calamity happening, because the floating part of the hoist can be let up without hesitation to its end position which is just a few meters above its normal position where it comes gently to a stop of its own accord, as proved also by tests with models. Consequently, the guide framework for the trough needs only to be calculated for the lateral force of the wind and for a vertical load of 50 tons per guide framework at the most.

During long stoppages and in the case of work being interrupted, the trough can also be left standing at the upper level, so that, were it to run empty all of a sudden, it would rise only 4.5 m. The floating part, as tests with models have shown, will rise only slowly also when the trough runs empty in its lowest position, because the wide, flat float offers great resistance to the trough moving upwards at an excessive speed, all the more so, as the unloading of the float can only proceed slowly.

For this reason the mechanical drive in this new hoist is not to be self-locking as in the case of the spindle hoist with vertical floats. Racks and pinions are foreseen for the main drive which have a much higher efficiency than the self-locking spindles employed hitherto. The current consumption and, with it, the costs of current are therefore much lower in the case of the new system.

If the float is built just wide enough to let it pass through the lower level, it is possible to build the float in a shipyard at the same time as the float shaft and the trough compartment then

necessary are being built on the site and thus greatly curtail the building time.

After the float shaft and trough compartment are built, both are filled with water up to the water level of the lower level, the gate of the lower level is then opened and the float moves into the trough compartment. The gate is then closed again and the water in the shaft lowered to the water level necessary for operations.

The trough for the ships has been completed in the meantime on a scaffolding at an appropriate height above the float shaft. The surface of the water

in the float shaft is then lowered so far as to allow the trough supports to be installed between the float and the trough. The float shaft is then filled again with water until the float rests firmly on the bearings of the supports and carries the trough.

The process is reversed when the float has to be taken out to have it repaired or painted. The float can in this way be brought in a short time into the lower level and pulled on to a slipway set up beforehand.

For reasons of safety, the float is subdivided by a number of bulkheads into small individual compartments in such a way that, when two neighboring compartments are full of water, it will still float if a quantity of water in keeping with the diminished buoyancy is run out of the trough.

If one wishes to have a very wide float, in order that the upward movement may be a very slow one in the event of a calamity happening, the float is divided in its longitudinal axis, when the halves can be of such a size that each half can pass through the gate of the lower level on its own.

If the float is made twice as wide as originally assumed, its height will be reduced by half, i.e., instead of the float of 7 m in height, it will only be $\frac{1}{2} \times 7 = 3.5 \text{ m}$ in height. When the trough is empty, a float of this kind will then emerge only

$$1 + 1.75 = 2.75 \text{ m}$$

above the normal top position.

A hoist with flat floats offers enormous advantages in impervious soil or rocky sub-soil, as the float shaft can then be made in dry ground and its walls require only a thin lining of concrete.

In order to have always the same buoyancy during the lifting and lowering of the trough despite the emersion and immersion of the trough supports, shafts can be fitted in the body of the float

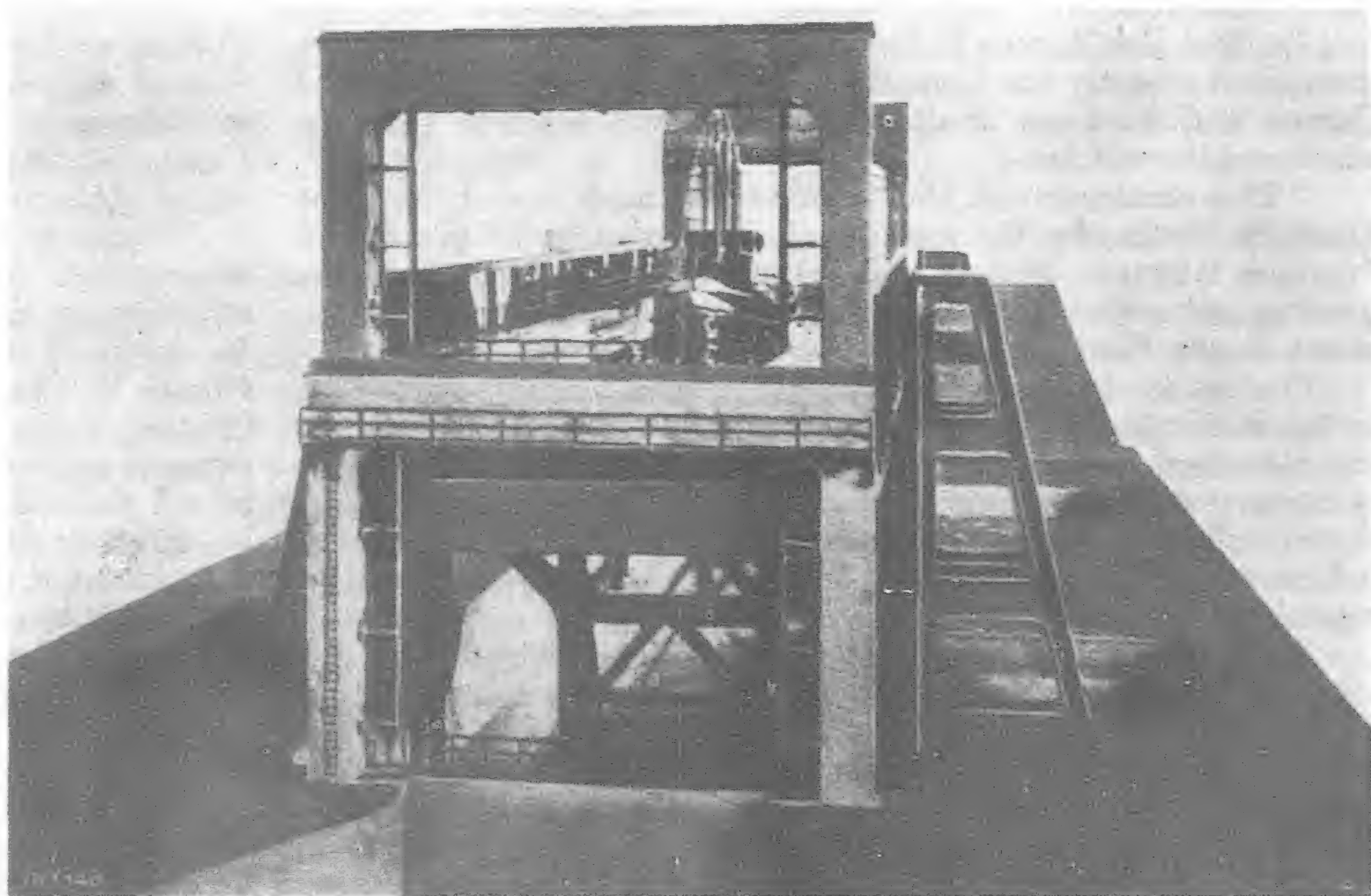


Fig. 3.—Model (1 : 50) of the Demag ship hoist with a flat float (German patent) for ships of 1,500 tons burden and a lift of 15 m.

in which pistons driven by the lifting gear move in keeping with the variable water displacement of the emerging and immersing trough supports. If the trough is standing at the lower level, when the supports between the float and the trough are completely immersed, the pistons are at the top, with the result that the buoyancy of the float is decreased in keeping with the buoyancy of the immersed trough supports. If the trough is standing at the upper level, then the pistons are standing in their lowest position and the buoyancy of the float is increased by the quantity of water then displaced from the shafts. The pistons can also be driven by separate motors arranged in parallel with the lifting motor. The arrangement of such pistons is indicated in Fig. 2.

Figs. 1 and 3 show the model on the scale of 1 : 50 made by Demag of a ship hoist with flat float for ships of 1,500 tons burden and 15 m lift. The float in the model is 1.6 m long, 0.29 m wide and 0.14 m high. The model trough has a length of 1.76 m, a width of 0.25 m and a water depth of 0.06 m. The lifting height of the trough in the model is 30 cm corresponding to 15 m in the natural size. The width of the gap between float and wall of the shaft in the model is 1 cm right round corresponding to 0.5 m in the natural size of the hoist. The trough is driven by a small electric motor which turns, by means of a worm and wheel gear, four pinions which mesh with the racks on the four fixed guide pedestals. The pinions are interconnected by longitudinal and transverse shafts and assure the uniform horizontal position of the trough. All driving gears are mounted under the bottom of the trough.

If, in the case of the model, the trough carried by the float is let down into the lower position and the water then allowed to run out of the trough, the trough and the float start moving on their own at approximately the same speed as with mechanical drive after $\frac{1}{8}$ — $\frac{1}{6}$ of the contents of the trough has run out. As the water

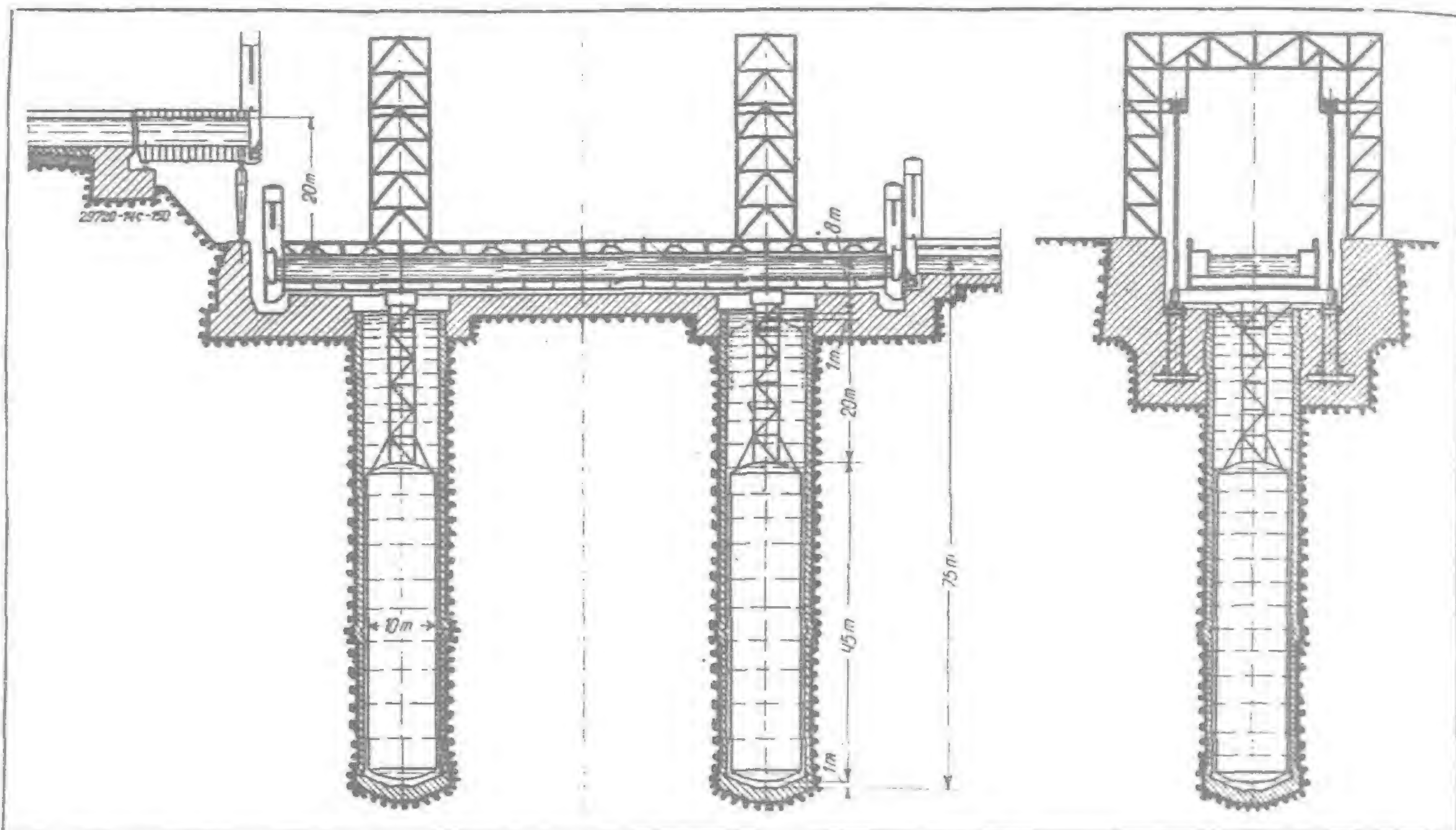


Fig. 4.—Ship hoist with two cylindrical upright floats for ships of 1,500 tons burden and a lift of 20 m.

continues to run out of the trough, the float then rises gradually so long until the balance has been re-established. The extent to which the float emerges in the end position corresponds to the quantity of water that has run out of the trough. A very interesting feature is that the trough stops in its end position absolutely without any impact at all. If one forcibly prevents the trough in the lowest position from moving upwards so long until the trough is completely empty and then releases it, then it will rise at a speed which is in fact higher but for all that is comparatively low and then, in consequence of the gradual emersion of the float, comes slowly to a stop without any impact whatsoever. In reality this can never happen, as the trough has already arrived in the normal top position long before it has run completely empty.

Similar and numerous other tests made on the large model proved to Demag that the assumptions that served as a basis for the model were correct and that a ship hoist with flat float can be built more cheaply and quickly and also work more economically than the plants built hitherto.

COLUMBIA OPENS SINO-JAPANESE DEPARTMENT

Dr. Nicholas Murray Butler, President of Columbia University, announced recently the formation at Columbia of a department of Chinese and Japanese studies, combining two separate units for administrative efficiency.

"This amalgamation should make Columbia one of the great American centers for the training of scholars in both Chinese and Japanese language, history and culture and should facilitate the training of persons capable of interpreting and solving developments in the Far East," Dr. Butler's announcement said.

Courses in Japanese history and religion formerly sponsored by the Institute of Japanese Studies will be offered under the direction of the new department. The institute will continue to function as supervisor of the growing Japanese library, which now contains 25,000 volumes. During the academic year 1938-39 instruction in Japanese art, religion, history and economic development will be expanded.

Dr. Butler stressed the fact that both the Chinese and the Japanese libraries are becoming increasingly important at Columbia. He disclosed that the university has received a \$25,000 grant for the purchase of additional books and materials for the Chinese library. Plans are now under way for the complete cataloguing of both the Chinese and Japanese collections.

Dr. L. Carrington Goodrich, associate professor of Chinese, said: "From the student's point of view, the new department affords not only an excellent opportunity for the study of either

Chinese or Japanese or both, but also enables him to receive advanced degrees, either the degree of Master of Arts or of Doctor of Philosophy in the department, with major emphasis on either Chinese or Japanese." Dr. Goodrich will become the executive officer of the new unit.

Origin of the whole Chinese course of study at Columbia sprung from the gold rush of 1848, when labor for railway construction, gardening and mining was being imported from China. In charge of one of the mining camps was a young man named Horace W. Carpentier, of the class of '48, who had in his employ a Chinese, Dean Lung. Dean Lung's hard work, faithfulness and patience made such an impression on Mr. Carpentier that he decided to aid the coming together culturally of the East and the West by donating \$100,000 in 1901 for the establishment of the Chinese department at Columbia, and later added \$113,000.

Dr. Butler also announced recently the acquisition of forty-five odd pieces of movable metal printing and wooden printing type, formerly the property of Mrs. James S. Gale, of Bath, England, whose husband, the late Rev. Dr. James S. Gale, was a Korean missionary. In the course of his studies, Dr. Gale investigated the Korean experiments with the casting of single metal types, which antedate the earliest European experiments by about thirty years. According to Dr. Gale, the Korean government undertook through royal decree in 1403 to cast metal types and to print from these a large number of books at public expense.

Australia's Mineral Store

By "G.P." in *The Austral-Asiatic Bulletin*

IT is unfortunate that no comprehensive review of the mineral resources of Australia has been published for some time. It is of the utmost importance that the available quantities, proven and potential, of the principal minerals should be known, and their rate of extraction related to public policy. This is all the more urgent when international tension centers around the problem of access to raw materials, and when hungry military powers profess to believe that Australian resources are undeveloped and extensive. The action in 1937 of the Federal Government in restricting the export of iron ore, perhaps directed to prevent the equipment of the Yampi Sound leases by Japanese interests, but aimed ostensibly at the conservation of supplies, has raised this issue very prominently. Would it not be reasonable to suppose that by now the whole subject had been fully investigated, and that a definite policy, covering all minerals in short supply, had been determined upon the facts? However, there has been no indication that such procedure is contemplated, and a general review of the position is needed to consider, in the absence of official guidance, what changes in policy may be desirable.

Particulars of Australian mineral resources are not readily available, and private enquiry can only give a brief and quite inadequate survey. As there is neither a Commonwealth department of mines nor of geological survey, the particulars of deposits of economic value are buried in the voluminous publications of the Mines Departments of the various States, from which they cannot be easily extracted. Professional bodies, such as the Australian Institute of Mining and Metallurgy, have paid relatively little attention to this aspect of their profession in their technical proceedings. There are a limited number of reports dealing with the mineral wealth of Australia. These reports are by no means comprehensive. (1). Nevertheless, it is possible to estimate the known reserves of the principal minerals and, by comparison with the trends of consumption, form some opinion as to their adequacy. There can, of course, be no rigid test of the adequacy of given resources. The probable life may be based upon current consumption or upon some arbitrary figure which seems a reasonable estimate of average consumption in future. As an indication, future consumption has been taken upon two bases—firstly, that of a highly industrialized population of seven million people, and secondly, that of a highly industrialized population of twenty-five millions. This latter figure has been adopted as being about the limit of the population which expert opinion considers the continent can feed upon the present dietary regimen.

Iron Ore

Mr. Essington Lewis estimated in 1929 that at least 375-400 million tons of high grade iron ore were known in Australia. The deposits of economic importance amounted to not less than 350 million tons, of which 250 million was located in Eyre's Peninsula, South Australia, and the balance at Kaloon Island, in Yampi Sound. In 1937, it was stated that these deposits had been greatly over-estimated, and that, if the rate of increase in consumption was maintained, the supplies in sight would last only 50 years. On the other hand, one expert claimed that the total deposits, including low grade ores not at present commercially attractive, amounted to nearly 1,000 million tons. (2).

It is safe, therefore, to accept an estimate of 400 million tons as the minimum quantity of commercial ore available. Mr. Essington Lewis mentions that Australia has ample supplies of limestone and dolomite for smelting, that a large part of the ore reserves have a high manganiferous content, and that extensive deposits of high grade manganese of 1-2 million tons of mercantile material are available.

Consumption of iron ore is about one million tons per annum, and the production of steel approximately 800,000 tons or 0.1 tons of steel per head per annum. The annual consumption of steel by the United States, Germany and Great Britain is about 0.3 tons per head. On this basis, Australian consumption is comparatively

low, but Australia is an importer and these countries are exporters of fabricated steel products. The annual consumption of France is 0.2 tons per head, and this figure is probably a fair estimate of Australian annual requirements per head. At present, little scrap is used for the production of steel in Australia, but, allowing for some increase in scrap, the consumption of iron ore should, in time, increase to two million tons per annum. On this basis, proved reserves have a life of two centuries, but an industrialized population of 25 million consuming as little as five million tons of steel per annum would speedily exhaust these reserves.

Coal

Although Australia contains substantial deposits of high grade coals and lignites, the Continent is, after Central and South America, the most poorly endowed land mass in the world. Proved reserves of coals and lignite amount to 20.9 and 10.6 thousand million metric tons respectively, approximately three per cent of the world's quantitatively estimated resources. (3). Probable reserves amount to a further 140 thousand million metric tons, bringing the whole to about one per cent of the world's solid fuel resources. A further obvious limitation is the geographical distribution of the Australian deposits. The main reserves are located in the New South Wales coalfields and in the Victorian lignites, whilst the remainder of the continent has inadequate resources with practically no alternative source of power.

Current consumption of coal is about ten million tons per annum, or slightly more than $1\frac{1}{4}$ tons per head. This compares with an annual consumption of 3-4 tons per head in highly industrialized nations, like Germany and the United States. The probable life of the Australian reserves cannot be estimated, as there is no way of foretelling to what levels coal consumption will rise with the growth of the chemical industry and of self-sufficiency. Following the calculation of the German Institute for Business Cycle Research, the coal reserves of the world should last 37 centuries on the basis of the average consumption for the years 1925-1935. If consumption increased 0.5 per cent per annum, this life would be reduced to six centuries. If the rate of extraction increased by as much as two per cent per annum, the world reserves would disappear in a little more than 200 years. In order that Australian reserves should be depleted at the same rate as those of the world as a whole, current extraction would need to be about 75 million tons per annum: that is to say, the consumption of a fully industrialized community of 25 million people. Consequently, it is reasonable to conclude that the Australian reserves are adequate for a population of this size.

Lead and Zinc

From published reports, the proved reserves of the Broken Hill lead-zinc mines are 15 million tons, and the probable reserves another 20 million tons for the southern leases. The Mount Isa, Lake George, and Roseberry mines account for a further 15 million tons. Thus, the total lead-zinc ores amount to some 50 million tons with a probable content of five million tons of lead, four million tons of zinc. Current annual consumption of primary lead is about 22,000 tons and primary spelter about 29,000 tons. This is equivalent to about 7.3 lb. of lead and 9.0 lb. of spelter per head per annum. The consumption of these metals varies quite considerably between the leading industrial countries. (4). This is partly due to the fact that these metals form a revolving fund, and secondary recoveries from scrap are considerable. It is also a reflection of the activity of the building and motor trades. In 1937, the average consumption of the world's leading industrial countries was practically identical with Australian consumption. Upon this basis, Australia is well placed. But Australia is a leading exporter of lead and zinc, extracting ore at the rate of three million tons per annum. At this rate, known resources will be dispersed within the next twenty-five years.

Copper

Although copper ores are of common occurrence, there are few commercial deposits left in Australia. The Mount Lyell and Mount Morgan mines have probable reserves of about 15 million tons, containing not more than 150,000 tons of copper. The small but rich shows in the Cloncurry district can be relied upon for an additional 100,000 tons. Australian consumption of raw copper is about 13,000 tons or 4.5 lb. per head per annum. Average world consumption of the leading industrial nations is nearly treble Australian consumption, possibly as the result of the importation of fabricated copper goods. On the basis of an annual consumption of 9.0 lb. per head, copper reserves will last less than ten years.

Other Base Metals

Ignoring the precious metals, there are wide ranges of metals found in Australia, either in low grade deposits of no commercial importance or in restricted quantity. Only tin and wolfram are produced consistently, and the known reserves are inconsiderable. The most important deficiency lies in the absence of clays suitable for the production of aluminium and magnesium, although, as the Australian clays do not appear to have been comprehensively classified or surveyed, this apparent deficiency may later be remedied. At the best, the minor metals known to-day provide a useful standby against the risk of blockade in war, but no more. Geologically, according to E. E. Andrews, (5) conditions favor the deposition of many of these minor metals in small quantities, and their extraction may continue for many years without spectacular results.

Mineral Oil

It is sufficient to state that oil has been located in several areas in Australia—but not yet in commercial quantities. One or two geophysical crews are operating on the continent and perhaps £100,000 is expended annually in exploration. In contrast, 40 million dollars were spent in 11 years in the Gulf Coast of the United States alone, and in one year (1936) 95 geophysical crews were operating. Over the eleven years, 69 proved and 40 probable discoveries were made by geophysics as against 54 domes and fields by traditional methods in the preceding 33 years. Australian procedure, under Government subsidy and direction, compares unfavorably with modern technique, and it would be a fortunate accident should it prove successful.

The oil shales of Australia are rich but limited. They amount to 80 million tons with a gross content of 5,000 million gallons of crude oil. This is equivalent to about 15 years current consumption, assuming that treatment can be conducted commercially. Obviously, these shales are no more than a valuable reserve for defence.

Chemical Raw Materials

In view of the increasing importance of the chemical industry, a brief reference to its basic raw materials is desirable. Coal, limestone, the leading alkalis are, or will be, available in sufficient quantity. There are no native sulphur deposits but, according to Andrews, the complex sulphides of the chief mines should produce 3.4 million tons of sulphur. To this extent, the chemical industry is dependent upon the life of these mines; but in case of need, extensive surface deposits of gypsum might provide some 25 million tons more. Incidentally, Australia has no commercial deposits of potash or phosphates. Known deposits of alunite (for potash) and of phosphates are neither extensive nor valuable. The chemical industry, however, is so flexible that it is impossible to guess what raw material or what combination will become most vital to it.

Conclusion

This brief superficial summary of the mineral wealth of Australia points to certain tentative conclusions. In proportion to the size of the continent, Australia is poorly endowed with mineral wealth and the known deposits of the most important industrial minerals—iron and coal—are little more than sufficient for the needs of an optimum population of 25 million. The leading base metals, copper, lead and zinc, will be exhausted within a generation unless active prospecting locates important new ore bodies. The minor metals are unimportant. Reserves of crude oil, apart from possible hydrogenation, are trifling.

Chemical raw materials are barely extensive enough for the sound growth of this vitally important industry. On the basis of our knowledge to-day, the Continent would appear to have insufficient mineral reserves to support a highly industrialized population equal to the optimum number which, according to expert opinion, can be fed here. If this be so, plans of expansion based upon the extension of secondary industry would, in the end, be limited by the extent and diversification of the inadequate minerals available.

There is no justification on the known facts of mineral resources, for the glib assertions—as, for example, in the *Frankfurter Zeitung* of December 10 last—that Australia can easily sustain up to twenty times its present population. On the contrary, there is an evident need for the inauguration of a well-considered policy of mineral conservation, coupled with energetic steps to continue active exploration for those minerals in which we are, or will shortly be, deficient. Such a policy, such a campaign, transcends State boundaries and becomes a Federal matter. It requires at least the establishment of a properly staffed and equipped Federal department of geological survey, either to absorb or to collaborate with the financially starved Mines Departments of the various States. After a century of relatively easy reward from the exploitation of surface deposits, Australia is gradually approaching a position where prudent conservation can no longer be avoided.

- (1) The principal sources of information available are as follows:—
 - (a) The Mineral Wealth of Australia—a Forecast by E. C. Andrews. Proc. Aust. Inst. Mining and Met. Sept., 1929.
 - (b) Iron and Steel Industry of Australia. Essington Lewis. Jnl. Inst. Eng. Aust. Vol. 1, 1929.
 - (c) Power Resources of Commonwealth, by Inst. Eng. Aust. 1924.
- (2) Dr. J. R. Atcherley, Melbourne *Herald*, August 5, 1937.
- (3) The World Coal Mining Industry. Vol. 1. p. 38. I.L.O. 1938.
- (4) Metal Report: Branders Goldschmidt & Co. 1937—p. 23.
- (5) Op. cit. page 79. In this connection, a large deposit of high-grade magnesium has lately been reported in Tasmania.

Singapore Harbor

After providing for Interest and Sinking Fund Contributions in the sum of \$1,603,365.35 the Income and Expenditure Account shows a surplus of \$2,364,557.61 as compared with a surplus of \$479,479.92 last year. Of the total expenditure for the year amounting to \$7,461,540.09 the amount of \$1,867,372.41 or 25 per cent is uncontrollable by the Board, being Interest and Sinking Fund Contributions, Municipal Assessment and Audit Fees.

The number and total net registered tonnage of vessels berthed at the wharves during 1938 was 3,231 vessels, totalling 9,756,410 tons, compared with 3,242 vessels and 7,708,417 tons for the year 1937.

The trade handled at the wharves during the year was, in the aggregate, 3,384,003 tons or eight per cent more than that for the previous year. General cargo inward increased by 84,569 tons or six per cent, whilst general cargo outward increased by 99,251 tons or nine per cent. Coal inward increased by 39,512 tons or 17 per cent, whilst coal outward decreased by 2,350 tons or one per cent. Fuel oil inward increased by 16,097 tons or 16 per cent, and fuel oil outward increased by 5,488 tons or six per cent.

The mechanical coal handling plant is in course of erection and, it is anticipated, will be completed early in 1939. The shore bunkering installation and floating bunkering unit are being manufactured and will also be ready for use in 1939.

Plans for the reconstruction of the East Wharf are completed and the work will be commenced early in 1939.

The West Wharf Extension (Schemes "C" and "D") was practically completed during the year and was formerly opened by His Excellency the Governor, Sir T. S. W. Thomas, G.C.M.G., O.B.E., on July 28, 1938.

The question of providing additional dry dock and wharfage accommodation at Keppel Harbor is still receiving consideration. The wooden wharf east of the King's Dock entrance is being replaced by a reinforced concrete wharf.—*Dock and Harbor Authority.*

Danish Motor-ship "Kina" Will Go Into Far Eastern Service

ON Tuesday, January 17, 1939, the cargo motor-ship *Kina* built by the Nakskov Shipyard left the yard for Copenhagen, where the ship arrived after having carried out speed trials, by which a speed of 18 knots was attained. The contracted speed is 16 knots with loaded ship.

The ship has been built for The East Asiatic Company, Limited, of Copenhagen, in accordance with the special requirements for vessels serving this company's regular China-Japan route, and it means in many respects considerable progress over the ships previously built for this route. Special care has been taken to arrange the ship as practical and comfortable as possible for passengers. The cabins and messrooms of the crew are all very roomy and light.

The ship has been built to British Lloyd's highest class +100 A.1., and has the following principal dimensions:

Length	..	..	..	506-ft.	6-in.
Breadth	..	..	..	65-ft.	0-in.
Depth to upper deck	..	..	..	41-ft.	9-in.
Carrying capacity	..	..	..	about 12,300 tons.	

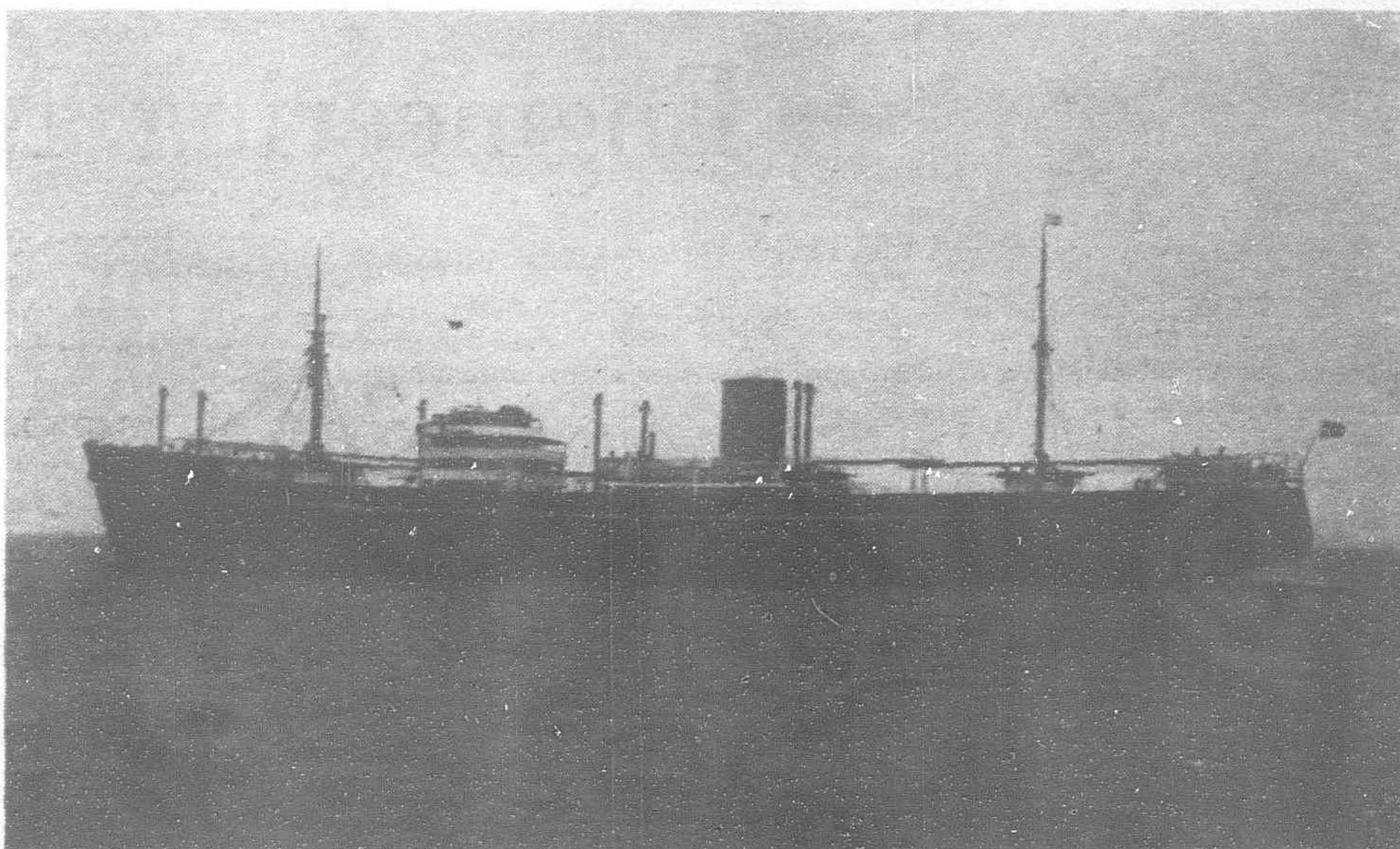
The main machinery, which consists of one eight cylinder B. & W., two stroke cycle Diesel motor, develops normally 11,000 i.h.p. The auxiliary machinery includes three four cylinder four stroke cycle Diesel motors, supplied by Burmeister & Wain. The ship has two complete steel decks and further tweendeck in Nos. 1, 2 and 3 cargo holds.

The *Kina* is provided with a modern carbonic acid fire extinguishing plant with a pipe-system which automatically shows any formation of smoke—be it ever so slight—in every room in the ship.

The vessel has six large hatches for the cargo holds, the size of which is 714,300 c.ft. bales. They are served by 16 derricks with electric winches of Thomas B. Thrige's manufacture. The lifting capacity of the derricks varies from three to five tons. Further, the ship is furnished with a heavy derrick for 40 tons. The steering gear is of Thomas B. Thrige's all electric type. The windlass is likewise electrically driven and has been supplied by Thomas B. Thrige, Odense, Denmark.

The passenger accommodation consists of six two berth cabins, which are large and airy and equipped with two chromium-plated bedsteads with rubber mattresses. Each cabin has own bathroom, with hot and cold water.

Forward in the saloon house a dining saloon accommodating 20 persons is situated. The



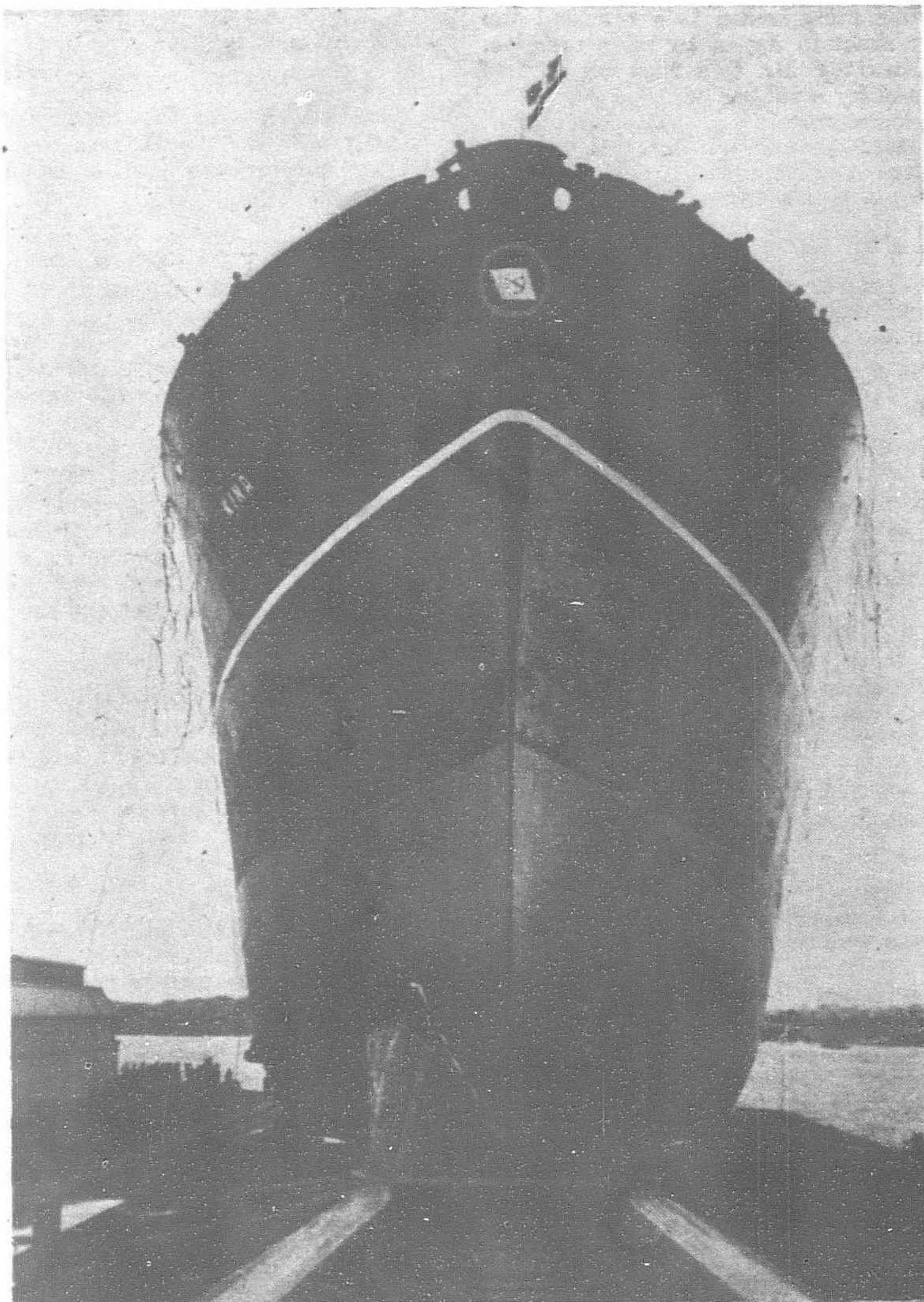
New Danish Motor-ship "Kina" as seen on her recent trial runs

saloon has been carried out with bulkheads and furniture of light mahogany. From the dining saloon a broad stairway leads to the passenger cabins and the smoking saloon on the promenade deck. The smoking saloon has likewise polished mahogany panelling. Everywhere in the cabins and saloons respectively noise-reducing rubber flooring, supplied by Bridana Ltd. of Copenhagen, and English Ruboleum have been used as a flooring.

The ship is furnished with oil-fired range and baking oven, and very spacious cooling chambers with refrigerating machines for provisions, etc., are provided. The refrigerating machinery has been supplied by Atlas Ltd., Copenhagen. An electric refrigerator of Thomas Ths. Sabroe & Co.'s manufacture is fitted in the scullery.

The life-saving appliances are of the most modern kind, and the life-boats are placed under Schat davits of latest type. The ship is fitted with a powerful radio station and radio direction finder, which have been supplied by Elektromekano Ltd., Copenhagen.

The construction of the ship was commenced in May, 1938, and the launching took place on November 5, 1938, when H.M. Queen Alexandrine of Denmark named the vessel.



Picture of launching of the Motor-ship "Kina" November 5, 1938, at Nakskov Shipyard

American Planes for China

Messages from New York state that the Bellanca Aircraft Corporation of Newcastle Delaware has made a contract with the Chinese Government for 200 aeroplanes, the manufacture of which has already begun.

The machines are to be modern fighter-bombers armed with five machine-guns. The price is to be about £1,660,000, and ten of the aeroplanes are to be delivered within 60 days of the signing of the contract. Thereafter between 25 and 50 machines are to be delivered each month.

Engineering Notes

AVIATION

HSINKING-PEKING LINE.—Regular air service between Hsinking and Peking was inaugurated in February. The schedule calls for planes to leave Hsinking on Mondays, Wednesdays, and Fridays with return flights on Tuesdays, Thursdays, and Saturdays.

NEW OSAKA AIRPORT.—A magnificent municipal airport, to cover 410 acres and to cost ¥10,000,000, is planned for Osaka in the near future. The 4,400,000 citizens of Greater Osaka long have felt the need of such an airfield, being a bit ashamed of the inadequate 82-acre landing field that now serves the city. It is believed that the elaborate new municipal airport will be situated either at Tatetsu, at the base of Mt. Ikoma, or at Sekime, on the Kyoto-Osaka electric line.

AIR BASE AT CEYLON.—Following an exhaustive scouting flight undertaken recently by three Sunderland type seaplanes over the Singapore-Penang-Trincomalee-Colombo route, the British Government has decided to establish a new military air base at Ceylon. The proposed base will be used as one of the chief outposts of the British Far Eastern command in liaison with Burma and Singapore, and it will also assure a swift and safe delivery of supplies to all threatened points in the Far East.

BUYING CONDOR PLANES.—The Dai Nippon Air Transport Company, has decided to purchase three Condor-type airliners from the German Focke-Wulf Company, according to the *Nichi Nichi*. Negotiations between the Focke-Wulf Company and the Japanese firm are said to have been completed for the purchase of three Condors of the FW-200 mode which was flown from Berlin to Tokyo in a little more than 46 hours by a crew of five Germans headed by Captain Alfred Henke, chief pilot. The planes are reported to cost ¥800,000 each, highest price ever paid by a Japanese firm for a foreign plane.

GLIDER RECORD.—By remaining in the air 9 hours 33 minutes over Mt. Ikoma near Osaka, First Class Glider Pilot Isamu Oda smashed the endurance and altitude records of glider flight in Japan by wide margins. The soarer of the Mitsuno 301 type manned by Mr. Oda took off at 7.45 a.m. from a slope of Mt. Ikoma, catapulted by a rubber cord. Favored by ideal weather conditions, he circled over the mountain repeatedly at altitudes ranging from 1,300 to 1,600 meters and later 2,600 meters. Mr. Oda brought his glider to a beautiful landing at Tatetsu Airfield at 5.25 p.m. smashing the previous Japan endurance record of 5 hours 56 minutes under the rubber-catapult method.

NEW AVIATION CONCERN.—Incorporation of the ¥6,000,000 China Aviation Company, to be jointly established and managed by Japan and China, at Peiping, was decided at a meeting in Peiping of aviation authorities. The company is to be an extension of the activities of the Huitung Aviation Company established at Peiping November 7, 1936, following the conclusion of an aviation agreement between the Japanese authorities in North China and the former Chahar-Hopei Political Council. According to present plans, the new firm will operate five passenger and mail services, respectively connecting Peiping with Shanghai, Shanghai with Hankow, Shanghai with Canton, Peiping with Dairen and Peiping with Tatung, in Mongolia.

COMMUNICATIONS

NEW KAMMON TUNNEL.—The Japanese Civil Engineering Congress has approved the Home Office plan to construct a submarine highway tunnel beneath the Kammon (Shimonoseki-Moji) Strait in the way designed by government engineers. The Home Office intends to submit a bill, based on the recommendation of the congress, to the Diet. If the necessary appropriation is approved, the Home Office will begin construction in April this year.

100-PASSENGER AUTO BUS.—A new 100-passenger motorbus has been built by the Teikoku Jidosha Kogyo Kabsuhiki Kaisha, of Shibaura, Tokyo. The 100-passenger bus—the largest ever constructed in Japan—was completed by the Japanese concern in February in response to an order placed by the North Transport Co. of Manchoukuo. The gigantic vehicle was sent on a final test run from Tokyo over the Hakone mountain ranges to the main office of the Toyoda Jidosha Kaisha in Aichi prefecture. The bus was built under the supervision of the best workmen in Japan.

RAIL TUNNEL TO CHOSEN.—The construction bureau of the Japanese Railway Office proposes to begin in the spring of 1939 a technical survey for the route of a 123-mile submarine railway tunnel beneath the Chosen Strait. To that end, the bureau has decided to ask for an ¥800,000 appropriation in the 1939-40 fiscal year railway budget estimates. The bureau, upon the instruction of Railway Minister Chikuhei Nakajima, has organized the Chosen Strait submarine tunnel commission. Under the chairmanship of Chief Horikoshi of the bureau, the commission has been studying the various routes beneath the straits, recently deciding on a provisional route.

YUNNAN-BURMA LINE.—Announcement has been made by the Railway Ministry of the Chinese National Government that the railway linking Yunnan with British Burma which is now under construction will be completed in July next year, it has been learned here to-day from Chungking.

ANHWEI LINE REOPENS.—The railway extending over 214 kilometers between Yukichen and Luchow, Anhwei Province, which was repaired in August last year by the Japanese after being destroyed by the Chinese prior to the Hsuehchow encounter, has been opened to the general public in view of the increasing number of Chinese residents who have returned to the district.

NEW PHONE SERVICE.—Construction works of the direct telephone service between Tokyo and Mukden has been completed. It is expected to be formally inaugurated in the near future.

Meantime, a similar service between Osaka and Mukden will be put into operation toward the end of February, while one between Osaka and Tientsin is expected to be opened from the first part of the coming month. The construction works for the latter was scheduled to be completed by February 28.

NEW CHINESE RAILWAYS.—Two new railway lines which will serve as an improved artery for transporting munitions from the Soviet Union into north-western China, are being rushed toward completion.

The Chinese are now speeding up construction of a line extending from Paoki on the western border of Shensi province to Lanchow, capital of Kansu province, while the Soviets are converting the motor highway linking the Turksib Railway and the Chinese border with a new rail line.

Materials for the Paoki-Lanchow rail project were reported to have been obtained by the Kuomintang forces from railways in and near Japanese-occupied zones. A check up has revealed that the rails and ties of the Lunghai Railway between Chengchow and Tungkwang on the east border of Shensi province as well as those of the Peiping-Hankow Railway, north and south of Chengchow, had been completely removed and transported to Shensi and Kansu provinces.

INDUSTRIAL

BELGIAN STEEL FOR JAPAN.—Important negotiations are in progress between the Belgian and Japanese Governments for the supply of large quantities of Belgian steel to the great Japanese munitions firm Mitsubishi.

INDUSTRY REVIVES.—With fifteen factories, operating approximately 4,000 pans and employing about 15,000 men and women, restored, Central China's \$25,000,000-a-year silk growing and reeling industry is on the way to recovery, the Shanghai *Mainichi* reports. The number of plants now working in the Soochow, Wusih and Hangchow areas, the daily reported, is one-third of those before the outbreak of the hostilities.

POWER FIRM BORROWS.—The proposed flotation of ¥30,000,000 debentures by the Dai Nippon Electric Power Company, Tokyo, was announced on March 15 by the company's underwriters, the Sumitomo Bank and Mitsubishi Trust Company.

Out of the total ¥10,000,000 will be issued first on April 1. The annual interest rate is 4.3 per cent and the issue price ¥99.75. The debentures will mature in 10 years.

BLAST FURNACES IN U.S.S.R.—According to a report from Moscow, a new blast furnace has been built under the third 5-Year Plan at Krivoi-Rog; another blast furnace will be constructed in the course of the year. Each of these two plants has a capacity of 1,300 cubic meters. In the Novy Tagil district two furnaces will be put in operation with a capacity of 1,100 cubic meters each. It is proposed to construct 20 blast furnaces in all in the Soviet Union by 1942.

ANSHAN TO EXPAND.—After attending the general shareholders meeting of the Anshan Steel Material Company in Tokyo on February 6, at which the statement of accounts for the latter half of the past year was accepted with a 10 per cent dividend, Mr. Oka, managing director said the company will expand the manufacturing capacity of 55,000 tons a year to 100,000 tons, he stated. Equipment for manufacturing iron towers is under construction, and will be of 12,000 tons capacity, to be completed in June.

PHILIPPINES RAYON.—The Government-owned National Development Co. announces that it is studying plans for the construction of a \$2,000,000 rayon factory in Manila capable of producing 3½ tons of rayon daily, 300 days a year. The output contemplated by the company would amount to one-third of the total rayon imports of the Philippines, 70 per cent of which comes from Japan. Sr Manuel Roxas, chairman of the National Economic Council, said that if the N.D.C. directors approve of the plan, machinery will be purchased in the United States as soon as possible.